WEST VIRGINIA
AMERICAN WATER

June 25, 2019

Via Hand Delivery
Ms. Ingrid Ferrell
Executive Secretary
Public Service Commission of West Virginia
201 Brooks Street
Charleston, West Virginia 25323

11:33 AM JUN 26 2019 EXEC SEC DIV

Re: Status Report on Terms of Joint Stipulation for Case No. 14-0872-W-GI

Dear Ms. Ferrell:

West Virginia American Water Company (WVAWC) has prepared the enclosed status report to fulfill annual reporting requirements identified in the Terms of Joint Stipulation included in the Final Order for Case No. 14-0872-W-GI for filing as a closed entry in this case. The report also provides status updates for other recommendations in the Joint Stipulation. It does not include confidential information and can be shared with the public in the interest of transparency.

We ask that you please file the enclosed report and provide the twelve copies to the appropriate parties at the Commission. We also ask that you date stamp the extra copy provided and return it with our messenger. We appreciate your assistance in this matter.

Please contact me at 304-410-3973 or erica.pauken@amwater.com should you have any questions or comments regarding this submittal.

Sincerely,

Erica Pauken

Erica N. Pauken
Source Water Protection State Lead
Enclosure

Cc: West Virginia Bureau for Public Health, Source Water Protection Unit (w/enc)
Ohio River Valley Water Sanitation Commission (w/enc)

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Certification Statement

I certify that the information in the enclosed West Virginia American Water report submitted to the Public Service Commission of West Virginia in accordance with Case No. 14-0872-W-GI is complete and accurate to the best of my knowledge.

	Robert Burton
Signature of Responsible Party or Designee	Name of Authorized Signatory
6-18-2019	President
Date Signed	Title of Authorized Signatory

11:34 AM JUN 26 2019 EXEC SEC DIV

Status Report on Terms of Joint Stipulation

West Virginia American Water
Kanawha Valley System

Case No. 14-0872-W-GI
June 2019

Submitted to:

Public Service Commission
of West Virginia

WEST VIRGINIA
AMERICAN WATER

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List of Exhibits

ACRONYMS

AAR	After Action Report
AST	Aboveground Storage Tank
BPH	West Virginia Bureau for Public Health
DEP	West Virginia Department of Environmental Protection
DNR	West Virginia Department of Natural Resources
DO	Dissolved Oxygen
DOC	Dissolved Organic Carbon
DSIC	Distribution System Infrastructure Charge
GIS	Geographic Information System
GPD	Gallons Per Day
GPM	Gallons Per Minute
ICS	Incident Command System
KPEPC	Kanawha Putnam Emergency Planning Committee
KVS	Kanawha Valley System
KVTP	Kanawha Valley Treatment Plant
MG	Million Gallons
MGD	Million Gallons Per Day
NIMS	National Incident Management System
ODS	Organics Detection System
ORP	Oxidation Reduction Potential
ORSANCO	Ohio River Valley Water Sanitation Commission
PSC	Public Service Commission of West Virginia
PSSC	Potential Source of Significant Contamination
PWSSSC	Public Water System Supply Study Commission
SDS	Safety Data Sheet
SWPP	Source Water Protection Plan
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WVAWC	West Virginia American Water Company
ZCC	Zone of Critical Concern
ZPC	Zone of Peripheral Concern

PREFACE

The Public Service Commission of West Virginia (PSC or Commission) issued a Final Order for Case No. 14-0872-W-GI on June 15, 2017 to resolve the General Investigation into the response of West Virginia American Water Company (WVAWC or Company) to the January 9, 2014 chemical spill.

The Final Order approved a Joint Stipulation and Agreement for Settlement (Joint Stipulation), and in Section B of the order (page 6, entitled "Terms of Joint Stipulation") the Commission outlined the Joint Stipulation's provisions related to source water protection and contingency planning, communications, monitoring, reporting, operations, and system resiliency.

The following report has been prepared to fulfill annual reporting requirements identified in paragraphs 8, 9, and 12 of the Joint Stipulation and summarized at Sections B.1, B.2, and B.5 of the order. The report also includes status updates for the other recommendations in the Joint Stipulation.

1.0 SOURCE WATER PROTECTION PLANNING

In June 2016, WVAWC submitted a Source Water Protection Plan (SWPP) for the Kanawha Valley System (KVS), PWSID WV3302016, to the West Virginia Bureau for Public Health (BPH) in accordance with W.Va. Code §16-1-9c. A copy of the KVS SWPP public version was provided in the Status Report on Terms of Joint Stipulation submitted to the PSC in June 2017.

In June 2019, WVAWC completed the updated version of the KVS SWPP in accordance with W.Va. Code §16-1-9c(f), through a process that includes public participation. A copy of the 2019 KVS SWPP public version is attached as Exhibit 1. It is also available on the Company website at the link provided below, along with the original SWPP submitted in 2016.

https://amwater.com/wvaw/water-quality/source-water-protection/source-water-protection-plans.

Exhibit 2 provides a summary of implementation status to date for each of the action items identified in the Management Plan, Table 7 of the 2016 KVS SWPP. WVAWC Management staff tracks and reviews status on a routine basis to monitor progress. All identified activities are currently on track.

WVAWC developed an inventory of potential sources of significant contamination (PSSCs) for the KVS SWPP and has a program in place to review and proactively gather information and communicate with the identified PSSCs:

- The Company uses a Geographic Information System (GIS) map-based tool called WaterSuite to gather and manage information about PSSCs from various data sources for the KVS. The tool has the capability to search available data, add site-specific information and contacts, and generate reports.

- The priority PSSC list is reviewed and updated on an annual basis with input from local partners, as appropriate. This process was completed for 2019 and incorporated into the SWPP update. A summary of PSSC changes is shown in Exhibit 3.

- The Company has initiated outreach communications with each of the fixed PSSC facilities for which an address is available. WVAWC staff continues to engage PSSC facilities through various methods of communication (e.g., phone, email, face to face).

- WVAWC has developed support materials to improve communications with PSSC facilities. These include fiberglass signs and stickers with contact information in case of a spill, and flyers to help PSSC facilities understand why and how to share information about their operations with WVAWC. WVAWC developed a communications guide for employees to help them engage representatives from PSSC facilities and learn more about their operations.

- Water utilities do not have any regulatory authority to enforce PSSC communication requirements. There is no requirement for PSSC facilities to work with water utilities, aside from the AST notifications required by West Virginia Code §22-30-10. WVAWC has attempted direct communications; however, many have not responded even after several contact attempts.

WVAWC intends to continue outreach efforts while recognizing that some facility owners and operators may elect not to communicate with water utilities on a voluntary basis.

Exhibit 3 provides a metrics summary of progress on PSSC inventory and communications for the KVS. Note that the complete PSSC lists and maps include the location, characteristics and/or approximate quantities of contaminants that are not in the public domain and must therefore be maintained in a confidential manner. This information has been provided to BPH but is not included here to maintain confidentiality, as required by law.

Information about specific contaminants located at priority PSSC facilities is maintained through the West Virginia Department of Environmental Protection (DEP) Aboveground Storage Tank (AST) database. This information is not publicly available and was previously provided to WVAWC by BPH with confidentiality requirements. WVAWC personnel reviewed the AST contaminant data and information from various sources on treatment, testing, and monitoring options for the identified contaminants. As of March 1, 2019 water utilities no longer have access to the Aboveground Storage Tank (AST) database through the BPH. Discussions are ongoing regarding future access to the AST database.

Exhibit 4 presents a list of substances generally found throughout the area along with availability of data from typical sources of information reviewed. The changes over the past year in the types of chemicals identified in the area are reflected in Exhibit 4. Specific contaminant information for PSSC facilities and/or proprietary chemicals is not included for confidentiality purposes. WVAWC maintains copies of Safety Data Sheets (SDS) provided by the PSSCs in the WaterSuite system.

2.0 CONTINGENCY PLANNING

The KVS SWPP references a contingency plan that is consistent with the National Incident Management System (NIMS) and applicable United States Environmental Protection Agency guidance. The contingency plan documents the Company's planned response to contamination of the public surface water supply source for the Kanawha Valley Treatment Plant (KVTP). The public version of the KVS SWPP provides an overview of contingency plan components in Section 4.6 and Table 10.

The WVAWC Contingency Plan for a source water contamination event was updated in April 2019. Changes to the plan include training course title revisions and title changes of identified employees that receive initial notification of threats. All members of the WVAWC Incident Command team will review the new information changes. Training is complete for front-line production and water quality employees about our Contingency and Communications Plans and their roles and responsibilities during a potential source water contamination event. The updated Contingency Plan is included as Exhibit 5.

Personnel and resources are available to respond to contamination events appropriately and proportionally according to the roles identified in NIMS. Example Incident Command System (ICS) roles for various phases of a contamination event are provided in Attachment A of the Contingency Plan (Exhibit 5). WVAWC Management staff members are expected to successfully achieve certification in

certain NIMS courses within six months of their management assignments. A summary of current roles and training status for KVS staff is included as Exhibit 6.

In response to an event that requires initial notification to the public under W.Va. Code §16-1-9c(b)(11) and the accompanying BPH Rule, WVAWC will contact American Water's environmental compliance personnel within the time specified in that rule and consult with them within a reasonable period of time. Appropriate contact information is included in the Facility Emergency Response Plan and available to WVAWC staff through the internal computer network.

WVAWC maintains a Multi-Year Training and Exercise Plan that serves as a roadmap for training and exercise priorities for emergency preparedness. The plan was last updated in June 2018. On October 3, 2018, WVAWC hosted a second annual Kanawha Valley Source Water Protection, Preparedness, and Response Table Top Exercise. This exercise increased in complexity and incorporated action items from the 2017 tabletop exercise. The exercise objectives were to review Contingency and Communication Plans, policies and procedures; identify planning gaps; identify roles and responsibilities of emergency response partners and encourage interagency cooperation. A copy of the After Action Report (AAR) summary, improvement plan, and participant comments are included in Exhibit 7. Planning is underway for a full-scale exercise to be conducted with external partners in 2019.

3.0 COMMUNICATION TO PUBLIC ABOUT POTENTIAL THREATS

WVAWC maintains an incident/event reporting system that is consistent with BPH guidance, as outlined in KVS SWPP Table 9 and Appendix B Communications Plan.

In an event that requires initial notification to the public under W.Va. Code §16-1-9c(b)(11) and the accompanying BPH Rule, the Company intends to employ one or more different communication methods depending on the information available and assessed severity and threat level of the event. WVAWC will also notify the following: (i) the Kanawha County Commission; (ii) the City of Charleston; (iii) the Public Service Commission; (iv) the Consumer Advocate Division; (v) the Governor's Office; (vi) Kanawha County Emergency Management and Putnam-Kanawha Local Emergency Management Committees; and (vii) the West Virginia House of Delegates and Senate. The Company maintains email lists for key contacts that include representatives from each of these organizations.

WVAWC has designated primary and alternate staff members who have responsibility for maintaining confidential information and releasing that information to emergency responders as appropriate. They are identified in KVS SWPP Table 9.

4.0 MONITORING FOR CONTAMINANTS

The Joint Stipulation includes recommendations for source water monitoring systems. These are addressed by topic under the sub-headings below.

4.1 Existing Monitoring Capabilities

WVAWC has installed and continues to operate and maintain monitoring systems and water testing equipment that (i) have the technical capabilities required by W.Va. Code §24-2G-1 and (ii) are capable of testing for the categories of contaminants specified in W.Va. Code §24-2G-2(a)(1) as clarified in the Company's 2015 Report to the West Virginia Legislature.

The online source monitoring panel consists of the following parameters: pH, conductivity, oxidation reduction potential (ORP), temperature, dissolved oxygen (DO), dissolved organic carbon (DOC) via UV254 surrogate, and turbidity. These devices are not intended to identify specific contaminants, but rather to indicate a potential change in water quality that could be related to the types of contaminants specified in W.Va. Code §24-2G-2(a)(1). This equipment has been operational since 2015 and is maintained and calibrated regularly in accordance with WVAWC Standard Operating Procedures and manufacturer recommendations.

Data from the online panel is saved locally on a data recorder and transmitted via a secure network where it can be viewed in real-time on the WaterSuite platform. WVAWC partnered with international experts on an advanced event detection system that is capable of identifying statistical changes apart from baseline conditions that could indicate the presence of contamination. Use of this type of event detection system for source (raw) water monitoring is a relatively new application for the water industry.

The event detection system is currently running for the KVS, with WVAWC receiving alerts through WaterSuite and providing feedback on the information received for statistical model calibration. This is an iterative process involving data analysis, communication, and adjustments to alert criteria. WVAWC is receiving automated notifications via text and/or email to appropriate Company personnel when an alert occurs.

WVAWC has also developed internal capability to test for volatile organic compounds and semi-volatile organic compounds using advanced laboratory equipment. The Company constructed a laboratory at the KVTP in 2014 with two gas chromatograph mass spectrometers and hired a skilled laboratory specialist to operate this equipment on a regular basis. In 2016, a flame ionization detector was added for additional monitoring of fuels and oils based on the updated potential contaminant source inventory. A continuous monitoring system for volatile organic compounds has also been installed to enhance monitoring capabilities. See Section 4.3 for details.

4.2 Upstream Monitoring Pilot

WVAWC is committed to a pilot program to install in-stream monitoring equipment on the Elk River upstream of the KVTP intake. This is a complex undertaking due to various physical and logistical constraints and required approvals to install equipment in a regulated stream. The lower Elk River is a

navigational channel and is designated as an endangered species habitat for mussels and diamond darter, which further complicates the design and approval process.

The Company has made continued progress towards siting, designing, and obtaining the necessary approvals for the upstream monitoring pilot. The following summarizes key activities completed to date:

- Potesta and Associates, Inc. (Potesta) was retained to conduct a siting study that included evaluation of streamflow conditions, field reconnaissance, and preliminary design. The study identified potential challenges with access and endangered species considerations.

- WVAWC presented results of the initial study to representatives from WVDHHR and the Commission Staff in September 2017 and February 2018, respectively. The groups discussed alternatives to the designated locations approximately 30 and 60 minutes above the KVTP intake at average river flow, based on close proximity of the two points and relative distribution of potential sources of contamination in the area. The parties agreed to modify the stipulated settlement to relocate the 60 minute location further upstream to the confluence of the Elk River and Elk Two Mile Creek, pending results of endangered species studies.

- Based on findings from the siting study that limited streamflow and velocity data exist along this section of the Elk River, the Company established a partnership with the United States Geological Survey (USGS) to install a stream gage for real-time streamflow monitoring of the Elk River in the vicinity of KVTP. The equipment was installed in 2018. The resulting data is now available to the public through the USGS website below.

  https://waterdata.usgs.gov/usa/nwis/uv?03197950

- EnviroScience was retained through Potesta & Associates, Inc. to coordinate with the United States Fish and Wildlife Service (USFWS) and West Virginia Division of Natural Resources (DNR) on endangered species evaluation. EnviroScience conducted a preliminary habitat survey in 2017. Representatives from USFWS and DNR indicated that a complete mussel survey must be performed prior to granting approval.

- EnviroScience conducted a freshwater mussel survey on the Elk River during the summer of 2018. The purpose of the study was to identify sites that have the lowest potential to affect natural resources, including freshwater mussels. The final study report was submitted to USFWS and DNR in March 2019. A copy of the study report is included as Exhibit 8. Representatives from DNR provided an approval letter (Exhibit 9) to proceed with placement of upstream monitors. USFWS provided a letter of concurrence in June 2019, included as Exhibit 10.

- WVAWC is currently working with Potesta & Associates to apply for necessary permits and provide required notifications and requests for instream monitoring equipment installation.

The Company intends to update the Commission as the pilot study progresses and file the results of the study and its recommendations on the feasibility, reliability, and value of upstream river monitoring with the Commission. Once installed, WVAWC will not remove the equipment without Commission approval, but may seek Commission approval to modify or terminate the study if the equipment is significantly

damaged or destroyed more than once during the three-year study, or if WVAWC decides to make the upstream monitoring permanent.

4.3 Inficon CMS 5000

On December 13, 2017, an Inficon CMS 5000 Monitoring System was installed at the intake located at the Kanawha Valley Treatment Plant (KVTP). This new monitoring station along the Elk River is the most recent addition to the Organics Detection System (ODS) operated by the Ohio River Valley Water Sanitation Commission (ORSANCO). The ODS is a voluntary, cooperative effort involving water utilities, water users and ORSANCO staff to monitor volatile organic compounds (VOCs) throughout the Ohio River Basin. The KVTP Elk River Station is the newest member of 17 stations in the ODS network which provides monitoring and coordinated communication with upstream and downstream water utilities in the event of a spill or unreported release. ORSANCO staff provided support for the installation and subsequent testing and calibration of the Inficon CMS 5000 at KVTP. The equipment was offline for around six weeks in early 2018 due to an internal problem with the gas regulator. The unit was repaired and has otherwise been functioning continuously.

4.4 ORSANCO Coordination

WVAWC is coordinating with ORSANCO to: (i) incorporate an Inficon CMS 5000 Monitoring System installed at the KVTP into the ODS network; and (ii) conduct an evaluation of the monitoring systems in place at the KVTP and the frequency of sampling as compared to other systems throughout the ORSANCO network.

The Inficon CMS 5000 Monitoring System was installed at KVTP (see Section 4.3). The ORSANCO evaluation of KVTP's combined source monitoring systems is pending and will be conducted once the upstream monitoring pilot is approved and installed. In February 2019, WVAWC worked with Potesta & Associates, Inc. to develop a comprehensive Quality Management Plan that is intended to be the basis of this evaluation.

4.5 DSIC Recovery

The Company may seek DSIC or any reasonable and appropriate recovery for the monitoring equipment recommended in the Joint Stipulation, as agreed by the Stipulating Parties.

5.0 TRANSPARENCY AND PERIODIC REPORTING

WVAWC agreed to file several reporting items with the Commission by July 1 each year. These are addressed under the sub-headings below for the period ending June 30, 2019.

5.1 Source Water Protection Plan

A copy of the 2016 KVS SWPP public version was included as Exhibit 1 in the Status Report on Terms of Joint Stipulation submitted to the PSC in June 2017. It was also available for public inspection and

feedback on the Company website at the links provided below. WVAWC updated the KVS SWPP in accordance with W.Va. Code §16-1-9c(f) prior to July 1, 2019. WVAWC engaged stakeholders from the Kanawha Valley Water System during the SWPP update process. A copy of the electronic invitation is included as Exhibit 11. WVAWC reached out to representatives from emergency response organizations and health agencies to request their input on potential threats.

The public outreach component consisted of two elements: a series of webinars in April 2019 followed by two public meetings in May 2019. Participants had the opportunity to ask questions and provide feedback online, in person, and in writing throughout the months of April and May. Continuous feedback is encouraged and comments can be submitted to us directly at any time on our website.

https://amwater.com/wvaw/water-quality/source-water-protection/source-water-protection-feedback-form

The original and updated Kanawha Valley Source Water Protection Plans can be accessed through the following link.

https://amwater.com/wvaw/water-quality/source-water-protection/source-water-protection-plans

5.2 Distribution Storage Capacity

A current summary of tanks in the KVS is attached as Exhibit 12. The total storage capacity of the KVS is approximately 50.5 million gallons (MG).

5.3 Design Compliance Status

The KVS is in compliance with the design standards in W.Va. CSR §64-77-9.4. As background, the BPH rules governing storage capacity for system design (Title 64, Series 77) establish the minimum storage capacity of an entire water system at the time of system design and construction. The rules are:

> *§64-77-1. General*
>
> 1.1.a. This rule has been prepared to assist professional engineers responsible for the design and construction of public water supply systems. The design of these facilities shall not be limited by minimum requirements, but shall meet the needs of the particular situation. Nothing in this rule shall be construed as preventing the consulting engineer from recommending, or the West Virginia Department of Health and Human Resources (DHHR), Bureau for Public Health, from approving, more effective treatment where local conditions dictate such action.
>
> *§64-77-9. Finished Water Storage*
>
> 9.1.a.2. The minimum storage capacity (or equivalent capacity) for systems providing fire protection shall be equal to twice the average daily demand of one hundred fifty (150) gallons per customer per day plus fire flow unless it can be demonstrated that the supply capacity of the system is sufficient to warrant less. This requirement may be reduced

when the source and treatment facilities have sufficient capacity with standby power to supplement peak demands of the system.

9.4. Distribution Storage -- The applicable design standards of subsection 9.1 of this rule shall be followed for distribution system storage. The minimum storage capacity (or equivalent capacity) for systems providing fire protection shall be equal to twice the average daily demand of one hundred fifty (150) gallons per customer per day plus fire flow unless it can be demonstrated that the supply capacity of the system is sufficient to warrant less. All tanks shall be controlled to provide an adequate turn-over of at least twenty percent (20%) of the total volume each twenty-four (24) hour period. The Environmental Engineering Division may allow a variance to the minimum twenty percent (20%) turn-over requirement, if adequate justification is provided. This may require a main line altitude valve or externally controlled valves.

Although the BPH regulations are applicable only to newly designed systems, the Company has performed the calculations showing the KVS meets the design standard in BPH Rule §64-77-9.4, as if it were a new system. The calculations assume a maximum needed fire flow of 3,500 gallons per minute for a three-hour duration, the period used in the International Organization for Standardization's municipal grading schedule.

If designed as a new system, the KVS would be required to have design storage capacity of 25.97 million gallons (MG). The actual system-wide storage capacity is approximately 50.5 MG.

The KVS serves approximately 84,466 customers. Therefore, the calculation for minimum storage capacity using §64-77-9.1.a.2 is:

- Average Daily Demand: 84,466 customers x 150 gpd x 2 days = 25.34 MG of storage *PLUS*
- Fire Flow: 3,500 gallons per minute (gpm) x 180 minutes (3 hours) = 0.63 MG of storage
- Required storage capacity is 25.34 MG + 0.63 MG = 25.97 MG of storage capacity

The calculation for minimum storage capacity using the actual average daily demand is:

- Average Daily Demand: 27.4 MGD[1] X 2 = 54.8 MG of storage *PLUS*
- Fire Flow: 3,500 gpm X 180 minutes (3 hours) = 0.63 MG of storage *LESS*
- KVTP is capable of providing 22.6 MGD additional capacity (50.0 MGD – 27.4 MGD = 22.6 MGD) to supplement peak demands of the system[2]
- Required storage capacity is (54.8 MG + 0.63 MG) – 22.6 MG = 32.83 MG of storage capacity

[1] Instead of using 150 gpd per customer to estimate average daily demand, we have used actual average daily demand on the system. The average daily demand based upon the year 2018 is 27.4 million gallons per day (MGD). This is a more conservative calculation than is required under the rule.

[2] In accordance with §64-77-9.1.a.2, the design requirement may be reduced when the source and treatment facilities have sufficient capacity with standby power to supplement peak demands of the system. The KVTP has backup power in the form of an independent and secondary power feed from AEP which can operate the plant at full capacity. The rated capacity of the KVTP is 50.0 MGD.

Due to system demands and hydraulics and the need to maintain tank turnover for water quality purposes, the amount of water actually stored in system tanks varies over the course of a day and across time periods.

5.4 Source Monitoring System Status

Source monitoring systems and water testing equipment are in place and continue to operate at the KVTP. These systems are capable of testing for the categories of contaminants specified in W.Va. Code §24-2G-2(a)(1) as clarified in the Company's 2015 Report to the West Virginia Legislature. Additional information about the existing source monitoring systems is provided in Section 4.1.

6.0 INTERCONNECTION OF NEW STORAGE TANKS

Two new four (4) million gallon pre-stressed concrete tanks have been constructed in Amandaville. The tanks were placed into service at the end of 2017. WVAWC has a manual system interconnection to allow water stored in the two new tanks to be available to reinforce the main 850 gradient at times when additional storage is determined by the Company to be necessary. WVAWC purchased material and completed system modifications to install an electronically-controlled valve which is expected to be completed in 2019.

7.0 ENHANCED SYSTEM RESILIENCY

The Joint Stipulation provides that within one year of the Final Order, WVAWC will conduct and file a study of means to enhance the resiliency of the KVS, including but not limited to alternatives such as a second intake for the KVTP on the Kanawha River, expanded storage capacity, and other operational enhancements. The study was completed with support from the American Water Service Corporate Engineering group to include the items specified in the Joint Stipulation. It was filed under separate cover within the required timeframe.

In 2018, WVAWC filed an expanded version of the Kanawha Valley Alternate Source of Supply Feasibility Report. The expanded report incorporated Potesta & Associates' findings in the Raw Water and Sediment Study Report for the Kanawha River and considered feasibility of finished water storage as a potential alternative, in addition to the previously identified alternatives. Project costs were updated from 2015 to 2018 dollars. Accordingly, the potential rate impacts to customers were also updated to reflect the new costs. Preparations for additional feasibility studies, including treatability of the Kanawha River, are currently underway.

Certain portions of the study and supporting materials may be designated as confidential, as agreed by the Stipulating Parties and consistent with the Rules of the Commission.

8.0 PRODUCTION

The minimum storage level guideline for the Vandalia control tank will be increased from forty feet to forty-five feet when cold weather warrants it. This decision will be made by KVTP supervisory staff based on weather conditions and system operation, and communicated to operators, as appropriate. This guideline is in place for the winter months.

Exhibit 1

Kanawha Valley System Source Water Protection Plan, Public Version, June 2019

Source Water Protection Plan

West Virginia American Water
Kanawha Valley Water System

PWSID WV3302016
Kanawha County

WVBPH Submittal
Public Version

June 2019

WEST VIRGINIA
AMERICAN WATER

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AAR	After Action Report
DWMAPS	Drinking Water Mapping Application to Protect Source Waters
ERP	Emergency Response Plan
GAC	Granular Activated Carbon
GC/MS	Gas Chromatograph / Mass Spectrometer
GIS	Geographic Information System
GPD	Gallons Per Day
LEPC	Local Emergency Planning Committee
MG	Million Gallons
MGD	Million Gallons Per Day
NIMS	National Incident Management System
NPDES	National Pollutant Discharge Elimination System
NRW	Non-Revenue Water
ORSANCO	Ohio River Sanitation Commission
PSC	West Virginia Public Service Commission
PSSC	Potential Source of Significant Contamination
PWSID	Public Water System Identification
RCRA	Resource Conservation and Recovery Act
SDS	Safety Data Sheet
SDWA	Safe Drinking Water Act
SDWIS	Safe Drinking Water Information System
SWAP	Source Water Assessment Program
SWPP	Source Water Protection Plan
TIERS	Tiered Incident / Event Reporting System
UFW	Unaccounted for Water
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WSDA	Watershed Delineation Area
WTP	Water Treatment Plant
WVAW	West Virginia American Water
WVBPH	West Virginia Bureau for Public Health
WVDEP	West Virginia Department of Environmental Protection
WVDHHR	West Virginia Department of Health and Human Resources
WVDHSEM	Division of Homeland Security and Emergency Management
WVWARN	West Virginia Water/Wastewater Agency Response Network
ZCC	Zone of Critical Concern
ZPC	Zone of Peripheral Concern

1.0 INTRODUCTION

Source water protection is an important component of a multi-faceted approach – along with effective treatment, distribution, and monitoring – to provide high quality drinking water for the public. This Source Water Protection Plan (SWPP) Update has been developed in accordance with applicable regulations as part of an overall program to continue to provide reliable, quality drinking water for our customers. The program involves identifying potential risks that could affect the drinking water supply and seeking to manage those risks, when possible, to maintain supply quantity and quality.

Certain components of the plan cannot be shared publicly or are protected from public disclosure for safety and security purposes. These components are not included in the public SWPP; they will be submitted to West Virginia Bureau for Public Health (WVBPH) separately.

This public version of the SWPP includes program goals and objectives (Section 2.0), the regulatory framework (Section 3.0), specific plan components (Section 4.0), plan implementation and updates (Section 5.0), and stakeholder engagement activities (Section 6.0). The tables, figures, and appendices referenced throughout the plan text are included in later sections of the document.

2.0 PROGRAM GOALS

West Virginia American Water (WVAW) has established a mission and goals for source water protection that aligns with our Company vision of *clean water for life* and our commitment to our customers and the communities we serve.

Mission: We are dedicated to providing reliable, quality drinking water for our customers. We value source water protection as an important part of this process and are committed to be the industry leader in working with regulators and the community on efforts to sustain drinking water sources.

Goals: Our source water protection program goals are public protection, community leadership, resource stewardship, and operational efficiency. Each includes a series of objectives shown below.

PUBLIC PROTECTION

Identify and understand risks to source water
Monitor for potential contaminant impacts
Prepare for and respond to events

COMMUNITY LEADERSHIP

Promote public awareness and education
Engage stakeholders in source water protection
Collaborate to share ideas and practices

RESOURCE STEWARDSHIP

Promote sustainable use & quality of drinking water
Maintain excellent regulatory compliance record
Support environmental programs and activities

OPERATIONAL EFFICIENCY

Develop and implement cost-effective solutions
Manage operational risks related to water supply
Optimize treatment based on source conditions

3.0 REGULATORY FRAMEWORK

The Safe Drinking Water Act (SDWA) is the federal law passed in 1974 to protect public health by regulating public drinking water supplies. The original SDWA focused primarily on treatment to provide safe drinking water at the tap. The law was amended in 1986 and 1996 to include actions to protect drinking water at its sources. The amendments encourage states to establish a Source Water Assessment Program (SWAP) to delineate protection areas for each public water system, inventory potential contaminant sources, and establish susceptibility ratings.

In 1999, the WVBPH published the West Virginia Source Water Assessment and Protection Program, which was endorsed by the United States Environmental Protection Agency (USEPA). Over the next few years, WVBPH staff and contractors completed an assessment for all public water systems in West Virginia. The assessment for the Kanawha Valley Water System was completed in July 2002 and is available upon request from the West Virginia Department of Health and Human Resources (WVDHHR).

In 2014, the West Virginia Legislature passed Senate Bill 373, which amended §16-1-9 of the West Virginia Code with specific requirements for public water utilities that draw water from a surface water source or a surface water influenced groundwater source.

The amended law requires public water utilities to complete a SWPP that includes specific components by July 1, 2016, and update the plan at least every three years or when there is a substantial change in the potential sources of significant contamination within the identified zone of critical concern. WVBPH has 180 days from receiving a SWPP to approve, reject or modify the plan and must consult with the local public health officer and conduct at least one public hearing when reviewing the plan.

The Kanawha Valley Water System SWPP was submitted to WVBPH on June 29, 2016 and subsequently approved on December 19, 2016. The public SWPP documents are posted on our website at https://amwater.com/wvaw/water-quality/source-water-protection/source-water-protection-plans. This SWPP version is an update to the original plan developed in 2016.

Senate Bill 373 also included a preliminary Aboveground Storage Tank (AST) Act, which was later repealed and amended with the passage of Senate Bill 423 in March 2015. The revised version amended and reenacted §22-30 of the West Virginia Code with requirements for owners and operators of ASTs to register tanks and meet certain design and operation standards.

In the context of source water protection, AST owners and operators are required under §22-30-10 to provide notice ***directly*** to the public water system and to emergency response organizations of the type and quantity of fluid stored in regulated ASTs and the location of the safety data sheets (SDS) associated with the fluids in storage.

West Virginia Code §16-1-9c requires public water utilities to maintain information about the location, characteristics and approximate quantities of potential sources of significant contamination in a confidential manner. Senate Bill 625, which was passed on March 11, 2016 and became effective 90 days later, amends §16-1-9c to clarify that public disclosure of certain information regarding potential sources of

contamination within a zone of critical concern is permitted to the extent it is in the public domain through a federal or state agency.

Table 1 provides the definitions of regulatory terms used throughout this SWPP.

4.0 PLAN COMPONENTS

The SWPP includes various components required by West Virginia Code §16-1-9c. These are presented by topic within this section.

4.1 System Operational Information

The Kanawha Valley Water System is a regulated water utility that provides drinking water to the public from a surface water source. Table 2 provides updated information about the system including the population served, water treatment process, production statistics, storage capacities, and source of supply.

WVAW has reviewed production and storage capacity for the Kanawha Valley Water System to evaluate the ability to provide drinking water and protect public health. The ability to utilize available storage to mitigate the impacts of a contamination event will vary depending on the actual amount of finished water in storage and system demand at the time an event occurs. Detailed analysis for the Kanawha Valley Water System is included in the complete Alternate Supply Source Feasibility Report submitted to WVBPH. Storage calculations have been updated using 2018 information for this SWPP.

Water loss is another factor to consider when evaluating operational conditions because it contributes to the total system demand. Unaccounted for Water (UFW) is defined by the Public Service Commission (PSC) as the volume of water introduced into the distribution system minus the total of all metered usage and reasonably estimated non-metered usage. The target UFW rate identified by the PSC is 15%.

Utilities typically account for known water main breaks by estimating the amount of water lost for annual PSC reports. They are therefore not included in the UFW rate.

Table 3 presents updated water loss calculations for the Kanawha Valley Water System in 2018, including the total percentage of UFW as defined by the PSC as well as the combined percentage of UFW and water lost from main leaks. A description of measures that WVAW is actively taking to reduce the level of water loss experienced throughout the system is also included in Table 3.

4.2 Source Water Delineation and Characterization

Delineation is the process used to identify and map the area contributing water to the supply intake. Characterization involves describing conditions in the delineated areas that may impact water quantity and/or quality.

The delineation zones for surface water supplies are defined for regulatory purposes as the zone of critical concern (ZCC) and the zone of peripheral concern (ZPC). The watershed delineation area (WSDA) extends beyond these zones for planning purposes. See Table 1 for detailed definitions.

Figure 1 shows delineation zones for the Kanawha Valley Water System based on map data provided by WVBPH. Table 4 summarizes characteristics of the watershed and delineated zones including size, land use, and description of watershed conditions. There were no changes to the delineation zones from the original SWPP submitted in 2016.

4.3 Potential Sources of Significant Contamination

Potential sources of significant contamination (PSSCs) are facilities or activities that have the potential to release materials that could impact a drinking water supply. PSSCs can be identified by various methods such as regulatory data and local assessments.

WVBPH has provided PSSC data, working in cooperation with the West Virginia Department of Environmental Protection (WVDEP) and the Division of Homeland Security and Emergency Management (WVDHSEM), to public water utilities. WVAW has also identified additional PSSCs based on geographic information system (GIS) data, aerial imagery analysis, windshield surveys and local knowledge.

Some sources of data for this information are available to the public via federal and state databases. The USEPA has developed a tool called Drinking Water Mapping Application to Protect Source Waters (DWMAPS) available at https://www.epa.gov/sourcewaterprotection/dwmaps that allows users to select and view federal regulatory data for a given area on a map. WVBPH now has a similar public interface called the Source Water Protection Map Viewer available at https://oehsportal.wvdhhr.org/wvswap/index.html that shows state data for certain regulatory programs such as oil and gas, mining and discharge permits. This map can be searched by name or PWSID for public water systems across West Virginia. However, it does not include any confidential information such as aboveground storage tanks.

Figures 2 and 3 show screen shots of federal (DWMAPS) and state (WVBPH) maps, respectively, for the area around the Kanawha Valley Water System. Note that these maps are provided directly as shown on the respective websites and may be subject to change at any time.

The complete PSSC lists for the Kanawha Valley Water System include the location, characteristics and/or approximate quantities of contaminants that are not in the public domain and must therefore be maintained in a confidential manner. This information is included in the submittal to WVBPH but is not provided here to maintain confidentiality, as required by law.

Table 5 summarizes PSSCs identified within the ZCC and ZPC based on the WVBPH map data. Table 5 also includes the number of registered ASTs by zone of concern (details are confidential). WVDEP manages the AST program and maintains the regulatory data, which is currently restricted due to its sensitive nature and has not been released to the public. The information included in Table 5 is up-to-date as of the end of 2018.

PSSCs are evaluated and prioritized based on proximity to the intake; size and type of facility or activity; and type of materials that may be present. WVAW referenced various sources of information, including data mentioned above and the assessments provided in WVBPH's Source Water Protection Plan and Supplemental Guides (2016), and sought input from stakeholders as part of this process.

Prioritization is not a formal risk assessment. It is intended to guide development and implementation of focused management strategies. Identified priorities are PSSCs that warrant further investigation or action; they may not necessarily correlate directly with risk and may evolve over time as additional information becomes available or conditions change.

Table 6 provides an overview of the types of PSSCs identified as priorities for the Kanawha Valley Water System. The names and locations of specific facilities and/or activities identified as priority PSSCs are considered confidential and are provided separately in the submittal to WVBPH.

4.4 Management Strategies

A management plan has been developed to identify specific activities that WVAW intends to pursue, in cooperation with appropriate agencies and emergency response organizations, to understand and mitigate potential impacts of contamination of the source water supply.

The management plan consists of five key strategies: source management, source water monitoring, contingency planning, outreach and education, and providing input on policies and regulations. These strategies include various activities identified to address priority PSSCs and prepare for emergency situations as well as to communicate with customers, regulators, and partner organizations.

Table 7 lists the management strategies and corresponding activities along with a brief description of cost type, responsibility, and schedule for each activity. The schedule is presented by time periods (e.g., monthly, annual, etc.) rather than specific dates because the action items are expected to be completed on an ongoing basis.

As part of this SWPP update, WVAW asked the Horsley Witten Group to review the existing management plan and implementation progress. Table 7 has been updated to include additional management activities and specificity, where applicable, based on their recommendations. Section 5.0 provides additional information about implementation of the management plan.

4.5 Source Water Monitoring

WVAW has evaluated the technical and economic feasibility of implementing a source water monitoring system and submitted a report on these findings to the Joint Committee on Government and Finance in 2014 (WVAW, 2014).

During a USEPA workshop held in August 2014, federal regulators and water industry experts recommended online, multi-panel source water quality monitoring devices located at the intake as an effective option for detecting the presence of a variety of contaminants (USEPA, 2014).

This type of equipment establishes baseline water quality data and then alerts water plant operators to certain changes in water characteristics. These devices are not intended to identify specific contaminants but can alert water systems of a potential change in water quality, spurring further investigative testing.

WVAW has developed a source water monitoring approach that combines online water quality measurement devices at each of its water treatment plant intakes along with centralized internal analytical capability to test for volatile organic compounds and semi-volatile organic compounds on gas chromatograph / mass spectrometer (GC/MS) devices. We have expanded these capabilities and developed a comprehensive Quality Management Plan since the original SWPP was submitted in 2016. The source water monitoring systems provide continuous water quality indicator data and advanced organics analyses to optimize treatment operations and to identify the presence of potential contaminants.

Table 8 provides updated information about our current source monitoring capabilities and support network.

4.6 Communications and Contingency

WVAW has developed a communications plan that documents how we will, in cooperation with appropriate emergency response agencies, notify local health agencies and the public of a spill or contamination event. This includes provisions for initial notification to the public within thirty (30) minutes of WVAW becoming aware that the spill, release or potential contamination of the public water system poses a potential threat to public health and safety.

Table 9 presents an updated summary of communication team roles, methods, and alert levels according to the Tiered Incident / Event Reporting System (TIERS) method. The complete communications plan is included as Appendix B to this plan. Contact details for team members are listed in our Facility Emergency Response Plan.

A contingency plan has also been developed to document the planned response to contamination of the source water supply. It consists of a phased approach that meets State regulatory requirements for public notification and is consistent with National Incident Management System (NIMS) and United States Environmental Protection Agency (USEPA) guidance. The contingency plan is reviewed, updated, and exercised on an annual basis. It was last updated in 2018 and is scheduled for review in 2019.

Table 10 provides an overview of the phases of a potential contamination event and typical considerations for investigating and responding to a threat. We take potential threats very seriously and work with a sense of urgency to investigate and address the situation. It is important to note that specific actions will depend on the circumstances and the severity of an event, and will be determined based on conditions as they occur.

The contingency plan summary in Table 10 also includes an evaluation of current water and power supply capabilities as well as resources for additional support. Certain information is maintained as confidential for security reasons. For example, specific information about intake operations is not detailed here, but was provided to WVBPH as part of the complete Alternate Source of Supply Feasibility Report.

WVAW has established a multi-year training and exercise plan for the Contingency and Communications Plans. The training and exercise plan is reviewed and updated on an annual basis. It includes three key priorities: (1) Educate and engage employees to build awareness of existing plans and procedures; (2) Communicate and manage resources effectively during water emergencies following NIMS and chain of command protocol; and (3) Evaluate plans and incorporate lessons learned from exercises and real

events. Each year, WVAW conducts training and exercises in each operating area in accordance with the plan. After Action Reviews (AARs) are conducted with participants and the lessons learned are incorporated into plans and future exercises.

WVAW's emergency response plan (Emergency Preparedness Manual) for the Kanawha Valley Water System also includes specific details about emergency capabilities along with contacts for emergency services, coordination, and supplies. WVBPH has indicated that emergency response plans should be kept confidential and should **not** be submitted with SWPPs. A certification form is provided in Appendix C to confirm that WVAW has an emergency response plan in place that includes this information.

4.7 Alternate Sources of Supply

A feasibility report has been completed to evaluate alternate supply options for WVAW systems in accordance with West Virginia Code §16-1-9c. Table 11 presents an overview of options identified for the Kanawha Valley Water System.

Each identified option was evaluated according to a ranking process that considers the comparative costs, risks and benefits of implementation. Results of this analysis are presented in the feasibility report summary included as Appendix D to this plan. We have also partnered with Potesta & Associates, Inc. to complete a water and sediment sampling study along the Kanawha River to evaluate its suitability as a secondary source for the Kanawha Valley system. The Executive Summary and full report from this study are available at https://amwater.com/wvaw/water-quality/source-water-protection/kanawha-river-study.

The 2018 total estimated cost to implement the alternatives with the highest benefit and/or benefit-to-cost ratio score for WVAW systems is expected to range from approximately $194M to $226M (million) based on updated engineering cost estimates. The corresponding rate increase, using the current rate structure, would be between 13.2% and 15.4% for all WVAW customers. This represents the combined cost of alternatives for each system due to single tariff pricing that would impact all customers equally.

Ultimately, the feasibility of alternative supply options would be based on WVBPH and PSC approvals of a project sponsored by the company. Preparations for additional feasibility studies, including treatability, are currently underway. The company has not made a final determination at this time to seek such approvals.

5.0 PLAN IMPLEMENTATION

SWPP implementation is an important consideration for the overall effectiveness of the source water protection program. This is an ongoing process that includes completion and documentation of action items; identifying and addressing implementation challenges; and periodically evaluating and updating the plan.

5.1 Implementation Progress

WVAW tracks progress on management activities on a regular basis to document implementation of

action items. The documentation is maintained in a tabular format similar to that shown in the management plan (Table 7) to indicate the specific task, date, personnel involved, and notes for follow up actions.

Documentation also includes a chemical list, as identified in the management plan, which includes available information about PSSC materials. This information is currently linked in WaterSuite, a web-based tool that the company uses to manage PSSC data, so that it can be viewed along with a site report for a given location as well as independently by searching for the name of a substance. The WaterSuite database is updated with available data from various sources (e.g., regulatory data, Tier II reports, direct communications, etc.) and includes the material's physical properties, fate and transport, detection methods, treatability, health effects, and toxicity. The location and contact information for reference materials (e.g., SDS, permits, laboratories, sampling protocols, etc.) are linked to each site for additional information.

WVAW considers implementation status based on the documented progress on individual tasks for each activity identified in the management plan using the following indicators: on track (green), requires additional support (yellow), off track (red), or not applicable (gray). We have made substantial progress on each of the management activities and voluntarily reported that progress to WVBPH. A copy of the Source Water Protection Plan Implementation Progress Reports for 2017 (submitted on March 13, 2018) is provided in Appendix E.

5.2 Implementation Challenges

Certain challenges and/or limitations exist that may affect SWPP implementation. The following issues were identified in the latest Source Water Protection Plan Implementation Progress Report submitted to WVBPH in 2018.

- **Aboveground Storage Tank (AST) Notifications**: West Virginia Code §22-30-10 requires AST owners and operators to provide information about tank location and contents <u>directly</u> to water utilities. However, the estimated notification rate is only around 50% for AST owners and operators located upstream from our water systems. We encourage state health and environmental agencies to work together to enforce provisions of §22-30-10 requiring direct notification to water utilities.

- **Access to Updated PSSC Information**: WVAW maintains access to publicly available information through the WVBPH Office of Environmental Health Services portal. The user guide indicates the date that each layer was last updated; however, there does not appear to be a way to query this information for features within the layers. It is therefore difficult to track any changes that occur over time. We recommend building this capability into the tool.

- **PSSC Communications**: Water utilities do not have any regulatory authority to enforce PSSC communication requirements. There is no requirement for PSSC facilities to work with water utilities, aside from the AST notifications required by West Virginia Code §22-30-10. We have had some success in communications, but many others have not responded even after several contact attempts. We intend to continue outreach efforts while recognizing that some facility owners and operators may elect not to communicate with us on a voluntary basis.

Although these represent some of the significant challenges that exist at this time, additional issues may arise as implementation progresses and will be communicated to WVBPH accordingly.

5.3 Plan Evaluation and Updates

In accordance with West Virginia Code §16-1-9c-(f), this SWPP will be updated and submitted to WVBPH at least every three years or when there is a substantial change in the PSSCs within the ZCC. The management plan provided in Table 7 includes annual review of available information regarding PSSCs to identify whether substantial changes have occurred that may warrant a plan update.

WVAW will notify WVBPH and the public when full three-year SWPP updates are underway and provide information for how the public can provide input during the update process.

6.0 STAKEHOLDER ENGAGEMENT

We recognize that stakeholder engagement is an important part of source water protection planning and are committed to informing and engaging the public, local governments, local emergency planners, local health departments and area residents throughout the planning process.

WVBPH guidance includes the concept of a source water protection team, where the role of protection team members is to contribute information to the development of the source water protection plan, review draft plans and make recommendations to ensure accuracy and completeness, and when possible contribute to implementation and maintenance of the plan. Stakeholders that may be involved in these activities include representatives from local agencies, emergency response organizations, and the public.

6.1 Plan Development

WVAW developed a phased outreach approach to engage various groups during initial plan development. This included hosting a series of meetings to seek input and recommendations for the plans.

In February 2016, we invited public officials and representatives from state and local health agencies and emergency response organizations (e.g., fire, emergency services, LEPC) to participate in a group meeting for the Kanawha Valley Water System. Agenda topics included an overview of SWPP concepts and specific discussion of PSSCs and contingency and communication plan coordination.

WVAW held two public meetings in March 2016 for the Kanawha Valley Water System to provide an open forum for members of the public to review draft components of the plans, ask questions and provide feedback. The public meetings were advertised for several weeks prior to the event through various methods such as bill inserts, news releases, and social media.

Written comments submitted to WVAW through May 2016 were included as an Appendix to the original SWPP with the corresponding responses.

6.2 Plan Updates

WVAW engaged stakeholders in this SWPP update through a similar phased approach used during original plan development. We first reached out to representatives from emergency response organizations and health agencies to request their input on potential threats. This information was incorporated into the SWPP updates.

The public outreach component consisted of two elements: a series of webinars in April 2019 followed by two public meetings for the Kanawha Valley Water System in May 2019. Participants had the opportunity to ask questions and provide feedback online, in person, and in writing throughout the months of April and May.

The Horsley Witten prepared report summarizing the public meetings and webinars, including stakeholder feedback received, is provided in Appendix A. Table 12 provides the timing and description of engagement activities conducted to involve stakeholders in plan updates.

We encourage those who have further feedback and/or who would like to support implementation activities to submit their comments and contact information to us directly at any time on our website at www.westvirginiaamwater.com under the Water Quality > Source Water Protection > Source Water Protection Feedback Form menu. Direct link: https://amwater.com/wvaw/water-quality/source-water-protection/source-water-protection-feedback-form. Comments may also be submitted in writing to West Virginia American Water, Attn: Source Water Protection Lead, 1600 Pennsylvania Ave., Charleston, WV 25302.

7.0 REFERENCES

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Tables

Table 1: Regulatory Definitions

WEST VIRGINIA AMERICAN WATER

AST	**Aboveground Storage Tank**	***West Virginia Code §22-30-3***
	A device made to contain an accumulation of more than 1,320 gallons of fluids that are liquid at standard temperature and pressure, which is constructed primarily of non-earthen materials, including concrete, steel, plastic or fiberglass reinforced plastic, which provide structural support, more than 90% of the capacity of which is above the surface of the ground, and includes all ancillary pipes and dispensing systems up to the first point of isolation. The term includes stationary devices which are permanently affixed, and mobile devices which remain in one location on a continuous basis for 365 or more days.	
PSSC	**Potential Source of Significant Contamination**	***West Virginia Code §16-1-2***
	A facility or activity that stores, uses or produces substances or compounds with potential for significant contaminating impact if released into the source water of a public water supply.	
WSDA	**Watershed Delineation Area**	***WVDHHR Legislative Rule §64-3-14***
	The WSDA includes the entire watershed area upstream from a public water utility intake structure, up to the boundary of the state borders, a topographic boundary and is the perimeter of the catchment area that provides water to the water supply intake.	
ZCC	**Zone of Critical Concern**	***West Virginia Code §16-1-2, §64-3-14***
	A corridor along streams within a watershed that warrants detailed scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The zone of critical concern is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the zone of critical concern is based on a 5-hour time of travel of water in the streams to the water intake, plus an additional ¼-mile below the water intake. The width of the zone of critical concern is 1,000 feet measured horizontally from each bank of the principal stream and 500 feet measured horizontally from each bank of the tributaries draining into the principal stream. *Exception: Ohio River ZCC delineations are based on ORSANCO guidance and extend 25 miles above the intake and ¼-mile below the intake, with a lateral extent ¼-mile on both sides of the river (WVBPH).*	
ZPC	**Zone of Peripheral Concern**	***West Virginia Code §22-30-3***
	A corridor along streams within a watershed that warrants scrutiny due to its proximity to the surface water intake and the intake's susceptibility to potential contaminants within that corridor. The zone of peripheral concern is determined using a mathematical model that accounts for stream flows, gradient and area topography. The length of the zone of peripheral concern is based on an additional 5-hour time of travel of water in the streams beyond the perimeter of the zone of critical concern, which creates a protection zone of 10 hours above the water intake. The width of the zone of peripheral concern is 1,000 feet measured horizontally from each bank of the principal stream and 500 feet measured horizontally from each bank of the tributaries draining into the principal stream.	

Table 2: Water System Information

WEST VIRGINIA AMERICAN WATER

System Name	Kanawha Valley Water System	**PWSID**	WV3302016
Address	100 Dryden Street, Charleston, WV 25301	**County**	Kanawha
Service Connections	84,466 residential (including Montgomery & Coal River)	**Phone**	304-347-1540
Population Served Directly	194,547 (estimated)	**Type**	Community
Total Population Served	195,706 (estimated)		

	System Name	PWSID	Population
Bulk Water Purchasers	Lincoln PSD	WV3302207	1095
	Reamer Hill Water Assoc.	WV3302077	64
	City of Hurricane	WV3304005	Partial base supply
	City of Milton	WV3300609	Partial base supply

Note: The population served directly is calculated based on the number of residential service connections multiplied by the weighted average number of persons per household in the counties served as provided by WVBPH. The total population served includes the populations of bulk water purchaser systems as reported in SDWIS (February 2019).

Water Treatment Process	The Kanawha Valley Water Treatment Plant has a rated treatment capacity of 50 million gallons per day (MGD) and includes the following processes (in order): oxidation, coagulation, flocculation, clarification, granular activated carbon filtration, chlorination, corrosion control and fluoridation. The plant also has the capability to add powdered activated carbon.

Avg Hours Operation	24 hours (2018)	**Avg Quantity Produced***	27.4 MGD (2018)
Min Hours Operation	24 hours (2018)	**Min Quantity Produced***	22.3 MGD (2018)
Max Hours Operation	24 hours (2018)	**Max Quantity Produced***	41.2 MGD (2018)
Number of Storage Tanks	115	**Raw Water Storage**	0
Treated Water Storage	50.4 million gallons (excluding clearwell)		
Capacity for 5-Yr Demand	The plant has sufficient production capacity to meet demand over the next five years based on population projections, but there is no guarantee of an uninterrupted supply.		

** Refers to the amount of water pumped through the high service pumps*

Intake ID	Intake Name	Intake Description	Water Source	Date Constructed	Frequency of Use	Activity Status
IN001	KVTP – Elk River	Chambers beneath building	Elk River	1973	Primary	Active

Table 3: Water Loss Information

WEST VIRGINIA AMERICAN WATER

Total Water Pumped (gal)		10,011,700,000
Total Water Purchased (gal)		3,472,000
Total Water Pumped and Purchased (gal)		10,015,172,000
Water Loss Accounted for Except Main Leaks	Operational Use (gal)	167,852,000
	Fire Department (gal)	16,126,000
Total Water Loss Accounted for Except Main Leaks (gal)		183,978,000
Water Lost from Main Leaks (gal)		1,210,682,000
Total Amount of Water Sold (gal)		5,900,998,000
Total Unaccounted for Water (gal)		2,719,514,000
Total % Unaccounted for Water (%)		27.2%
Total Unaccounted for Water + Water Lost from Main Leaks (gal)		3,930,196,000
Total % Unaccounted for Water + Water Lost from Main Leaks (%)		39.2%

Note: The values provided above for this system were included in the 2018 totals reported to the PSC. The PSC defines unaccounted for water as the volume of water introduced into the distribution system minus the total of all metered usage and reasonably estimated non-metered usage. Unaccounted for water and known water main leaks are reported separately to the PSC in annual reports.

Measures to Reduce Water Loss

West Virginia American Water expends significant effort and resources to identify and correct issues leading to water loss. Our strategy focuses on leak prevention, pressure management, leak detection, metering programs, district metering zones, accounting for un-metered usages, and pipeline management. A standardized action plan and tracking mechanisms have been implemented to evaluate progress across all operational districts in the company. Each district utilizes a non-revenue water (NRW) activity report which tracks progress of practices and non-revenue usages. The following practices are generally implemented and tracked:

- Leak survey – manual and logger
- AMI and automatic leak detection
- Crossings/rights-of-way checked for leakage
- Pressure management for surge control
- Industrial site audits
- Customer large meter testing
- Efforts to reduce unauthorized water use and theft
- Replacement of leaking services
- Replacement of regulatory periodic meter changes
- System delivery meter testing/monitoring
- Retirement of parallel mains and service changeovers
- District metered area (DMA) to pinpoint water loss

In 2018, the unaccounted for water rate for our Kanawha Valley System was 27.2%. The target unaccounted for water rate is 15% as identified by the Public Service Commission.

Table 4: Watershed Delineations

WEST VIRGINIA AMERICAN WATER

Watershed Name (8-digit HUC)	Elk River (5050007)
Number of Source Water Protection Area(s)	1
Method of Delineation for Groundwater Sources	Not applicable; system only has surface water source(s)
Area of Wellhead Protection Area	Not applicable
Assessment and SWPP Dates	2002 & 2016

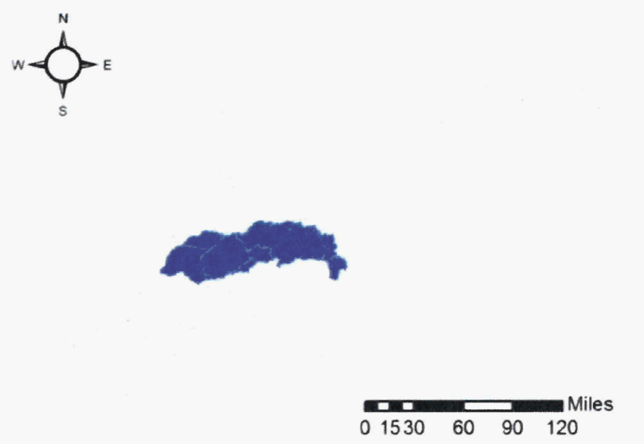
Intake	Size of ZCC	Size of ZPC	Size of WSDA
Kanawha Valley - Elk River	8,897 acres (13.9 sq mi)	25,582 acres (40.0 sq mi)	1,534 sq mi

ZCC – Zone of Critical Concern; ZPC – Zone of Peripheral Concern; WSDA – Watershed Delineation Area

Watershed Description

The Elk River Watershed has 3,213 miles of streams and rivers and contains the headwaters of the Elk River at the town of Slaty Fork in Pocahontas County. From Slaty Fork, the Elk River flows westerly to its confluence with the Kanawha River in Charleston. The Elk's major tributaries include Laurel Creek, Holly River, Birch River, Buffalo Creek, Big Sandy Creek and Blue Creek. The Elk River Watershed also encompasses Sutton Lake, which is located on the Elk River in the northern portion of the watershed near the town of Sutton in Braxton County.

Excerpt from West Virginia Watersheds: A Closer Look, WVDEP Water Use Section, November 2013



Land Use	ZCC	ZPC	WSDA
Barren Land	0.3%	0.2%	0.8%
Developed Land	32.1%	24.4%	5.5%
Forest / Shrub / Grass	64.2%	71.6%	91.1%
Pasture / Hay / Crops	0.8%	2.1%	2.1%
Wetlands	0.0%	0.0%	0.1%
Water	2.6%	1.8%	0.5%

Note: Land use calculated based on analysis of the latest available National Land Cover Dataset (Homer et al, 2015).

Table 5: PSSC Inventory

Potential Sources of Significant Contamination (PSSC)

State regulations require water utilities to maintain specific details about PSSCs in a confidential manner, including the location, characteristics, and approximate quantities of contaminants within the zone of concern. We have received PSSC information from the West Virginia Bureau for Public Health (WVBPH) and Department of Environmental Protection (WVDEP) and have performed additional work to gather information about PSSCs upstream of the water supply.

The following summarizes the types of PSSCs identified in the Zone of Critical Concern (ZCC) and Zone of Peripheral Concern (ZPC) for this water system. Note that this does not necessarily represent the number of individual facilities, as a single location or facility may contain more than one type of PSSC.

Source Water Assessment Program and Regulated Data Provided by WVBPH

PSSC Type: State	ZCC	ZPC
Abandoned Mine Lands	29 [redacted]	40
Abandoned Mine Land High Wall	1	1
Abandoned Mine Land Problem Area	10	15
Abandoned Mine Land Shape	3	4
Coal Bond Forfeiture	1	2
Leaking Underground Storage Tank	5	5
Mining Outlet	0	3
National Pollutant Discharge Elimination System (NPDES) Permit	57	129
National Pollutant Discharge Elimination System Permit Outlet	96	159
Oil and Gas Wells	54	459
Source Water Protection/Assessment PSSC Sites	62	66
Voluntary Remediation	5	7
PSSC Type: Federal	**ZCC**	**ZPC**
Toxic Release Inventory	1	1
Resource Conservation Recovery Act (RCRA)	69	103
National Pollutant Discharge Elimination System	89	168
All USEPA Federal Registry Service	174	295

Table 5:
PSSC Inventory

WEST VIRGINIA AMERICAN WATER

Aboveground Storage Tanks (ASTs)

West Virginia Code §22-30 requires owners and operators of Aboveground Storage Tanks (ASTs) capable of storing more than 1,320 gallons, with certain exclusions, to register tanks and provide information about their contents to public water utilities and the Department of Environmental Protection. The following is the total number of ASTs registered through December 2018

Description	ZCC	ZPC
Total number of registered ASTs	39	154

Table 6:
Priority PSSCs

The following summarizes the types of PSSCs identified as priorities based on proximity to the intake; size and type of facility or activity; and type of materials that may be present. Priority PSSCs warrant further investigation or action; they do not necessarily indicate a specific level of risk.

Priority PSSC Type	Description and Considerations *(in alphabetical order)*
Commercial Facilities	• Includes service and supply companies with known or suspected potentially hazardous materials • Regulatory permits may include hazardous waste management (RCRA) and/or stormwater discharges (NPDES) • Commercial facilities may use and store substances such as petroleum hydrocarbons, volatile organic compounds, and other materials that could impact source water if a release occurs
Industrial Facilities	• Includes concrete plants, an industrial park, and gas compressor stations • Regulatory permits may include hazardous waste management (RCRA) and/or wastewater discharges (NPDES) • Industrial facilities may manufacture, use, and store substances such as petroleum hydrocarbons, volatile organic compounds, synthetic organic compounds, and other materials that could impact source water if a release occurs
Mining Operations	• Includes a large mining complex with several active permitted areas in watershed • Regulatory permits required for active mining and/or wastewater discharges (NPDES) • Sedimentation, dewatering, mine drainage, and/or the storage of fuels and other materials associated with mining operations could impact source water if a release occurs
Municipal Facilities	• Includes federal, state and local facilities with fueling and/or deicing operations • Regulatory permits may include wastewater and/or stormwater discharges (NPDES) • Some municipal facilities may use and store substances such as petroleum hydrocarbons and deicing compounds that could impact source water if a release occurs
Oil & Gas Development	• Includes wells and/or fluid storage and transport associated with oil and gas development • Regulatory permits required for well drilling and operation and/or wastewater discharges (NPDES/UIC) • Oil & gas operations may include multiple locations with storage and transport of substances such as crude oil, brine mixtures, and other fluids that could impact source water if a release occurs
Transportation	• Includes roads, railroads, pipelines, and barge traffic along the Elk River • Various potentially hazardous materials may be transported through the area at any given time • Potential for a spill due to a transportation accident exists and is difficult to predict timing or location

Note: We considered municipal wastewater discharges in prioritizing PSSCs and found that these systems do not generally pose a significant threat because water treatment plants are designed to effectively treat normal municipal wastewater.

Table 7: Management Plan

WEST VIRGINIA AMERICAN WATER

The following tables identify specific management activities to pursue, in cooperation with appropriate agencies and emergency response organizations, to mitigate potential impacts of contamination of the source water supply. Action items will be documented and tracked on an ongoing basis.

PSSC Type	Management Activity	Cost Type	Responsibility	Schedule	Comments
Source Management					
Priority PSSCs	Communicate with identified PSSC facilities to understand their operations, materials used, and potential impacts to water system	O&M	Plant Team / SWP Lead	Annual	Prioritized based on proximity to intake, size, and type of materials
	Compile list of chemicals and identify sources of information for detection and treatment as well as information gaps and/or concerns	O&M	Plant Team / SWP Lead	Phased	Potential limitations based on data availability addressed in following action item
	Communicate any significant gaps and/or concerns identified with regulators	O&M	WQ/SWP Manager / SWP Lead	As Needed	Subsequent actions, if appropriate, to be identified and coordinated by regulators
	Continue to document communication methods and lessons learned	O&M	Plant Team / SWP Lead	Ongoing	
Company-Owned ASTs	Continue responsible management of treatment chemicals in internal operations	O&M	Plant Team	Ongoing	
Transportation	Request and review updated information about materials transported through area	O&M	Plant Team / SWP Lead	Annual	
Various	Perform annual review of available info and update priority list as appropriate	O&M	Plant Team / SWP Lead	Annual	

Table 7:
Management Plan

WEST VIRGINIA AMERICAN WATER

PSSC Type	Management Activity	Cost Type	Responsibility	Schedule	Comments
Source Water Monitoring					
Various	Continue process monitoring to identify changes in treatment characteristics	O&M	Plant Team	Daily	
Various	Continue source water quality indicator monitoring to identify significant changes	O&M	Plant Team	Daily	
Various	Implement event detection system to monitor changes in source water quality	O&M	Plant Team	Ongoing	
Bromide	Continue monthly bromide sampling and evaluate trends over time	O&M	Plant Team	Monthly	
HABs (Algae)	Maintain centralized capability to perform analyses for harmful algal bloom toxins	O&M	WQ Manager / SWP Lead	Ongoing	
Organics	Maintain centralized capability to perform advanced organics analyses	O&M	WQ Manager / SWP Lead	Ongoing	
Various	Partner with existing watershed monitoring networks to understand conditions	O&M	WQ Manager / SWP Lead	Ongoing	ORSANCO
Various	Continue to partner with local, state, multi-state, and federal agencies to obtain spill notification alerts	O&M	Plant Team / Management	Ongoing	
Various	Review laboratory capability support options	O&M	WQ Manager / SWP Lead	Annual	

Table 7: Management Plan

PSSC Type	Management Activity	Cost Type	Responsibility	Schedule	Comments
Contingency Planning					
Various	Review and update contact information in emergency response plan	O&M	Plant Team / Management	Annual	
Various	Review and update multi-year training and exercise plan	O&M	Plant Team / Management	Annual	
Various	Conduct review and/or training exercise of emergency response procedures	O&M	Plant Team / Management	Annual	
Various	Maintain relationship with local emergency responders and/or LEPC	O&M	Plant Team / Management	Ongoing	

Table 7: Management Plan

Management Activity	Cost Type	Responsibility	Schedule	Comments
Outreach and Education				
Include information about source water protection program in annual Consumer Confidence Report (CCR)	Included in annual budget	WQ Manager / SWP Lead	Annual	
Develop and distribute educational materials to customers on source water protection practices	O&M	External Affairs / SWP Lead	Ongoing	Print, website, social media
Continue to improve messaging around source water protection concepts	O&M	External Affairs / SWP Lead	Ongoing	"Drinking water supply"
Communicate contact information and good practices with upstream facilities with PSSCs	O&M	External Affairs / SWP Lead	Phased	Prioritized as described under source management
Provide ongoing mechanism for customer input on source water protection program activities	O&M	External Affairs / SWP Lead	Ongoing	
Continue to offer plant tours and/or open house events for local emergency responders, agencies, and the public	O&M	Plant Team / External Affairs	Ongoing	
Coordinate with educators to include source water and watershed management concepts in school curricula	O&M	External Affairs	Ongoing	
Continue outreach directed specifically to recreational and environmental groups	O&M	External Affairs / SWP Lead	Ongoing	
Encourage employees to participate in local activities and highlight the importance of clean water	O&M	External Affairs	Ongoing	

Table 7: Management Plan

Management Activity	Cost Type	Responsibility	Schedule	Comments
Outreach and Education (cont.)				
Establish source water collaborative to share ideas and practices with other water utilities and industry	O&M	Management Team	Ongoing	
Support watershed organizations through grants, awards and participation in community outreach events	O&M / Grants	Management Team	Ongoing	

Management Activity	Cost Type	Responsibility	Schedule	Comments
Input on Policies / Regulations				
Review and provide feedback on applicable permits and proposed regulations of interest or concern	O&M	WQ/SWP Manager / SWP Lead	Ongoing	
Support state and local measures for policies and regulations that balance watershed management with economic growth	O&M	Management Team	Ongoing	
Provide input to the Public Water System Supply Study Commission as appropriate	O&M	Management Team	Ongoing	

Note: Operation and maintenance (O&M) costs to perform these activities are included in customer rates; SWP – Source Water Protection; WQ – Water Quality

Table 8: Source Water Monitoring

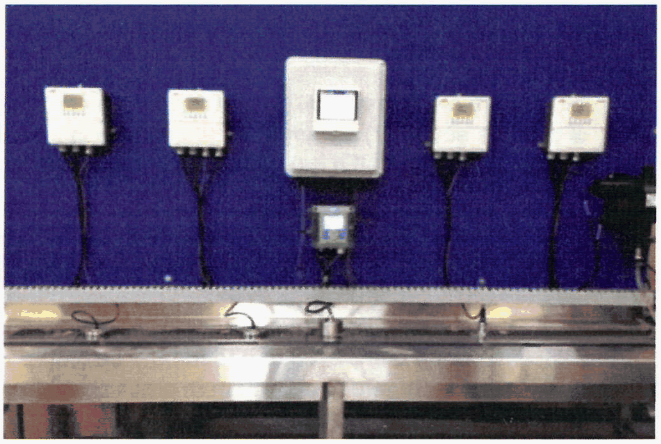
The following provides information related to the source water monitoring program that is currently implemented at our water treatment facilities.

Source Water Monitoring Program Overview
• Continuous raw water quality monitoring with online, multi-parameter devices • Centralized capability gas chromatograph/mass spectrometer (GC/MS) and gas chromatograph/flame ionization detector (GC/FID) for volatiles, semi-volatiles, and diesel/oil range organics
Online Monitoring Equipment Installed
• Selected based on reliability, location, purchase price, operation and maintenance • Measures seven (7) parameters: pH, temperature, conductivity, oxidation-reduction potential (ORP), turbidity, dissolved oxygen (DO), and dissolved organic carbon (DOC) via the UV254 method
Online Monitoring Data Management and Analysis
• Data stored locally on data recorder and transmitted real-time to cloud system for backup and analysis • Baseline period completed to understand seasonal variations in water quality parameters • Advanced event detection system in place capable of identifying statistical changes in water characteristics from baseline water quality, with real-time alert notification to water system personnel
Process to Determine Credibility of Contamination Event
• Review data in context of conditions (e.g., equipment calibration and maintenance, weather, stream flow, etc.) • Evaluate other information sources for signs of contamination (e.g., spill notifications, complaints, etc.) • See Contingency Plan for additional details related to investigating and confirming contamination events
Internal Laboratory Analytical Capabilities
• Two GC/MS units at Kanawha Valley Treatment Plant to test for volatile <u>and</u> semi-volatile organic compounds • GC/FID at Kanawha Valley Treatment Plant to test for diesel/oil range organics • GC/MS unit at Huntington Treatment Plant integrated into ORSANCO network for volatile organics analyses • Online process GC for volatile organic compounds at Kanawha Valley and Huntington Treatment Plants. Kanawha Valley Treatment Plant utilizing alerts and integrated into ORSANCO network • Ion chromatography unit capable of detecting both positively and negatively charged ions at Huntington Treatment Plant • Fully automated assay system at Huntington Treatment Plant for cyanotoxins. Cyanotoxin strips, readers and emergency response kits are at each WVAW operating area

Table 8: Source Water Monitoring

Monitoring System Component	Capital Investment	Est. Annual O&M
Online Monitoring Equipment (per facility)	$40,500	$6,700
Laboratory Equipment (at central location)	$400,000	$116,700
Laboratory Equipment Updates 2016-2018 (at Central and Western locations)	$616,000	$156,200

Technician operating GC/MS equipment at the Kanawha Valley Treatment Plant



Standard configuration for online monitoring equipment instrument bench at our facilities

Laboratory Support	• American Water Central Laboratory • Pace Analytical Services (formerly REIC) • Eurofins Eaton Analytical
Spill Notifications	• Direct contact from agency representatives and/or emergency responders • WVDEP spill notifications (via WVBPH District Office) • Upstream public water systems and/or facilities
Monitoring / Support Networks	• ORSANCO • WVRAIN • Other West Virginia American Water facilities
Upstream Monitoring (Elk River)	• Completed siting study, anchoring design, and habitat/freshwater mussel survey • Pursuing necessary approvals and permits for buoy installation • Installed stage/velocity gage in collaboration with USGS; Site Name: Elk River at Charleston; https://nwis.waterdata.usgs.gov/wv/nwis/uv?

Note: Contact information for support resources is maintained in the emergency response plan.

Table 9: Communications Plan Summary

TIERS - Tiered Incident / Event Reporting System (WVBPH)		
A	Announcement	Announcement about an incident or event that may pose a threat to the public
B	Boil Water Advisory	System users advised to boil water for drinking or cooking
C	Cannot Drink	System users should not drink or cook with water until further notice
D	Do Not Use	Water should only be used for flushing commodes and fire protection
E	Emergency	Water should not be used for any purpose until further notice

Initial notification will be issued within 30 minutes of determination that a potential threat to public health and safety exists.

Role	Organization	Title
Designated Spokesperson	West Virginia American Water	External Affairs Manager
Supporting Team Member	West Virginia American Water	Area Operations Manager
Supporting Team Member	West Virginia American Water	External Affairs Specialist
Regulatory Health Agency	WVBPH - State	Office of Environmental Health Services Director
Regulatory Health Agency	WVBPH - District	Supervising Engineer

Note: Additional partner agency contact details are listed in the emergency response plan.

Designated location to disseminate information to media	• Primary: WVAW Corporate Office, Charleston, WV • Alternate: To be determined based on situation
Potential methods of contacting affected customers (based on situation)	• Emergency customer notification system (phone, email, text) • Local media (press release, press conference, updates) • County emergency alert system where available • Website and social media (Facebook, Twitter, Instagram) • Door-to-door/door hangers • Publicly posted notices
Media and other external contacts	• Company email list for media, public officials, emergency response, health department and other key contacts: WVAW – Kanawha Valley Updates – External • The Media Center (satellite news services)
Staff responsible for maintaining confidential contaminant information & releasing to emergency responders	• Primary: Source Water Protection State Lead Erica Pauken, erica.pauken@amwater.com • Alternate: Water Quality and Environmental Compliance Manager Billie Suder, billie.suder@amwater.com • Alternate: Source Water Protection Program Manager Jennifer Heymann, jennifer.heymann@amwater.com

Table 9: Communications Plan Summary

WEST VIRGINIA AMERICAN WATER

Supplemental Contact Information

Bulk Water Purchasers

System Name	PWSID	Phone
Lincoln PSD	WV3302207	304-756-2141
Reamer Hill	WV3302077	304-548-4579
City of Hurricane	WV3304005	304-562-9906
City of Milton	WV3300609	304-743-3422

Downstream Water System

System Name	PWSID	Phone
WVAW Huntington System	WV3300608	304-525-8193 x5

EED District Office

Office	Contact	Phone
St. Albans District Office	J. D. Douglas	304-722-0611

Table 10: Contingency Plan Summary

WEST VIRGINIA AMERICAN WATER

We have developed a phased approach to respond to contamination of the surface water supply source for each of our water systems that meets the State regulatory requirements for public notification and is consistent with National Incident Management System (NIMS) and United States Environmental Protection Agency (USEPA) guidance.

The following provides an overview of the event response phases and various considerations that may be incorporated into the response. However, specific actions will depend on the circumstances and the severity of the event, and will be determined based on conditions as they occur.

Note: Additional information related to communication during an event is presented in the Communications Plan.

Initial Notification	• Company receives information about a potential contamination threat
Possible Phase	• Conduct initial investigation to evaluate threat and whether it poses a risk to public • Consider plans for operational response and communications
Credible Phase	• Communicate with appropriate agencies and notify the public within 30 minutes of determination that a threat to public health and safety exists • Continue investigation to characterize and confirm threat • Consider operational response • Determine whether threat can be confirmed through sampling or other evidence • Communicate updates to appropriate agencies and the public
Confirmed Phase	• Implement operational actions and support remedial actions to mitigate impacts • Consider resource needs and availability and seek support if appropriate • Determine whether threat continues to pose a risk to the public • Communicate updates to appropriate agencies and the public
Return to Normal	• Threat has been reduced or eliminated; return system to normal operations • Continue to monitor situation and modify course if appropriate • Communicate updates to appropriate agencies and the public

Typical Threat Investigation and Operational Response Considerations	
• Location of incident • Type and quantity of material(s) involved • Potential for the material(s) to move or migrate • Stream flow and weather conditions • Level of potential risk to public health and safety • Verification of threat from other information sources • Sampling and laboratory analysis results	• Current and predicted system conditions (e.g., demand, available storage, flow, etc.) • Contamination isolation or diversion • Treatment chemical or process adjustments • Alternative power and water supply options • Staff availability and scheduling • Resource availability and scheduling

Table 10: Contingency Plan Summary

WEST VIRGINIA AMERICAN WATER

The following describes existing capabilities and support arrangements to consider in the case of a contamination event with potential impacts to the water supply. Certain details and contacts are considered confidential for security reasons and are addressed elsewhere, as indicated.

Water Supply

- Single intake located on Elk River
- Total finished water storage capacity is approximately 50.4 million gallons (MG)
- Average and maximum daily system demands in 2018 were 27.4 and 41.2 million gallons per day (MGD)
- The ability to utilize storage to mitigate impacts of a contamination event will vary depending on the actual amount of finished water available in storage and system demand at the time an event occurs

The following information is provided to summarize intake capabilities. Additional details related to operations are included in the Alternate Source of Supply Feasibility Report.

- Ability to isolate or divert contaminated waters from the surface water intake: Partial
- Ability to close the intake in response to a contamination event: Typically yes. The amount of time that it can remain closed depends on system conditions.
- Ability to switch to an alternative source: None currently available

Power Supply

- Dual substation power feeds from AEP
- Standby / mobile generators ranging from 80 to 600 kW are available to supply power to major booster stations
- Maintenance is performed according to manufacturer recommendations by local personnel and approved vendors
- Standby generators are automatically tested on a routine basis

The following information is included in emergency response plans:

- Specific generator capabilities, connections, and on-hand fuel storage
- Local generator and fuel suppliers

Mutual Aid Agreements	• WVWARN • ORSANCO
Additional Support	• American Water Works Service Company and other affiliated companies

Table 11: Alternative Sources of Supply

West Virginia American Water

The following table provides an overview of alternative supply options specific to this water system. A feasibility report was prepared to evaluate each option based on comparative costs, risks and benefits of implementation. The feasibility report for the Kanawha Valley System was expanded in 2018. Estimated capital costs were updated for all systems to reflect 2018 pricing. Results of this analysis are included in the summary presented in Appendix D.

The 2018 total estimated cost to implement the alternatives with the highest benefit and/or benefit-to-cost ratio for all West Virginia American Water systems combined ranges from approximately $194 to $226 million (M) based on assumptions identified in preliminary engineering studies. Ultimately, the feasibility of alternative supply options would be based on WVBPH and PSC approvals of a project sponsored by the company. The company has not made a final determination at this time to seek such approvals. Preparations for additional feasibility studies, including treatability, are currently underway.

In 2017, WVAW completed a $9M (million) dollar project which added two new four-million-gallon water storage tanks to the Kanawha Valley System.

Type	Description	Est. Capital Cost	Considerations
Secondary Intake	Kanawha River at Charleston	$62.8M	• Assumes suitable water quality for treatment process* • Requires available property for intake and pump station • Requires permitting and approvals • Microtunneling and significant traffic control downtown • Fully redundant supply with opportunity for expansion
	Kanawha River at Chelyan	$153.1M	
Raw Water Storage	[redacted] 250 MG reservoir – 5-day storage at plant capacity	$142.4M	• Requires available property for reservoir • Requires permitting and approvals for dam construction that may be difficult and time consuming to obtain • Potential safety / environmental risks associated with dam • Limited supply capacity
Distribution Storage	Distribution System Improvements & Two Additional 1.0 MG Storage Tanks	$10.9M	• Requires available property for tanks • Limited supply capacity • Limited capability of expansion
Interconnections	*Not feasible*	N/A	• Combined capacity of nearby systems insufficient to meet demand
Other (Groundwater)	*Not feasible*	N/A	• More than 70 wells to meet demand • Variable groundwater quality / yield

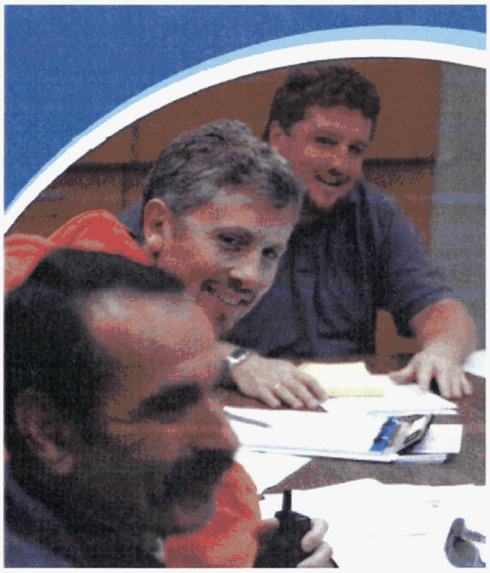
* **Kanawha River Water Quality Study** We partnered with Potesta & Associates, Inc. to conduct a water and sediment sampling study along the Kanawha River as a first step in evaluating its suitability as a secondary source of supply for the Kanawha Valley Treatment Plant. The full report is available at: https://amwater.com/wvaw/water-quality/source-water-protection/kanawha-river-study

Table 12: Stakeholder Engagement

WEST VIRGINIA AMERICAN WATER

The following table lists stakeholder engagement activities relative to the 2019 Source Water Protection Plan updates for all West Virginia American Water systems.

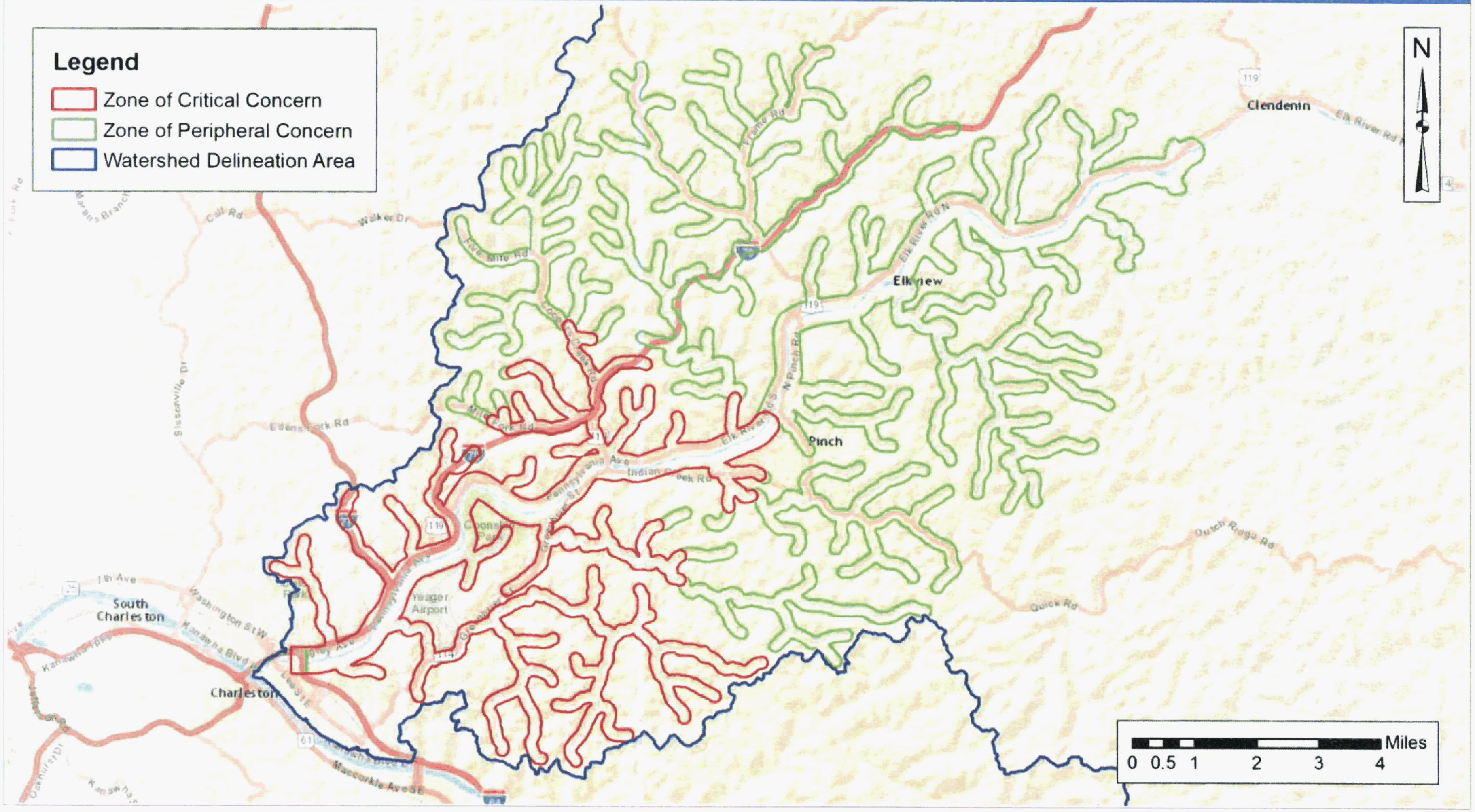
Type	Date	Description of Stakeholder Engagement Activity
Public Input Opportunity	September 2018	Hosted *Clean Streams*, a hazardous waste collection event, to reduce nonpoint source pollution and provided the public an avenue to comment on the Kanawha Valley system SWPP and PSSC list
Targeted Outreach	February 2019-May 2019	Engaged local officials, emergency planners, health departments, and other agency / organization representatives for input on SWPPs and PSSC lists
Bill Insert & Image	April-May 2019	Included information in/on monthly customer bills about how to get involved in the update process and provide input on source water protection by online form, webinar, in person at meetings or in writing
Website Update	April 2019	Updated the section *Water Quality > Source Water Protection* informing stakeholders how they can get involved through the online feedback form, webinars, in person meetings, or in writing
Webinars	April 2019	Added online webinar meetings to provide convenient options for stakeholders to review SWPPs and provide input
Public Meetings	May 2019	Hosted facilitated meetings open to the public to provide feedback on updated source water protection plan drafts with a comment period to extend through May 30, 2019
Social Media	Various / Ongoing	Education and outreach related to source water protection activities and opportunities for community involvement posted via West Virginia American Water Facebook, Instagram and Twitter accounts



Figures

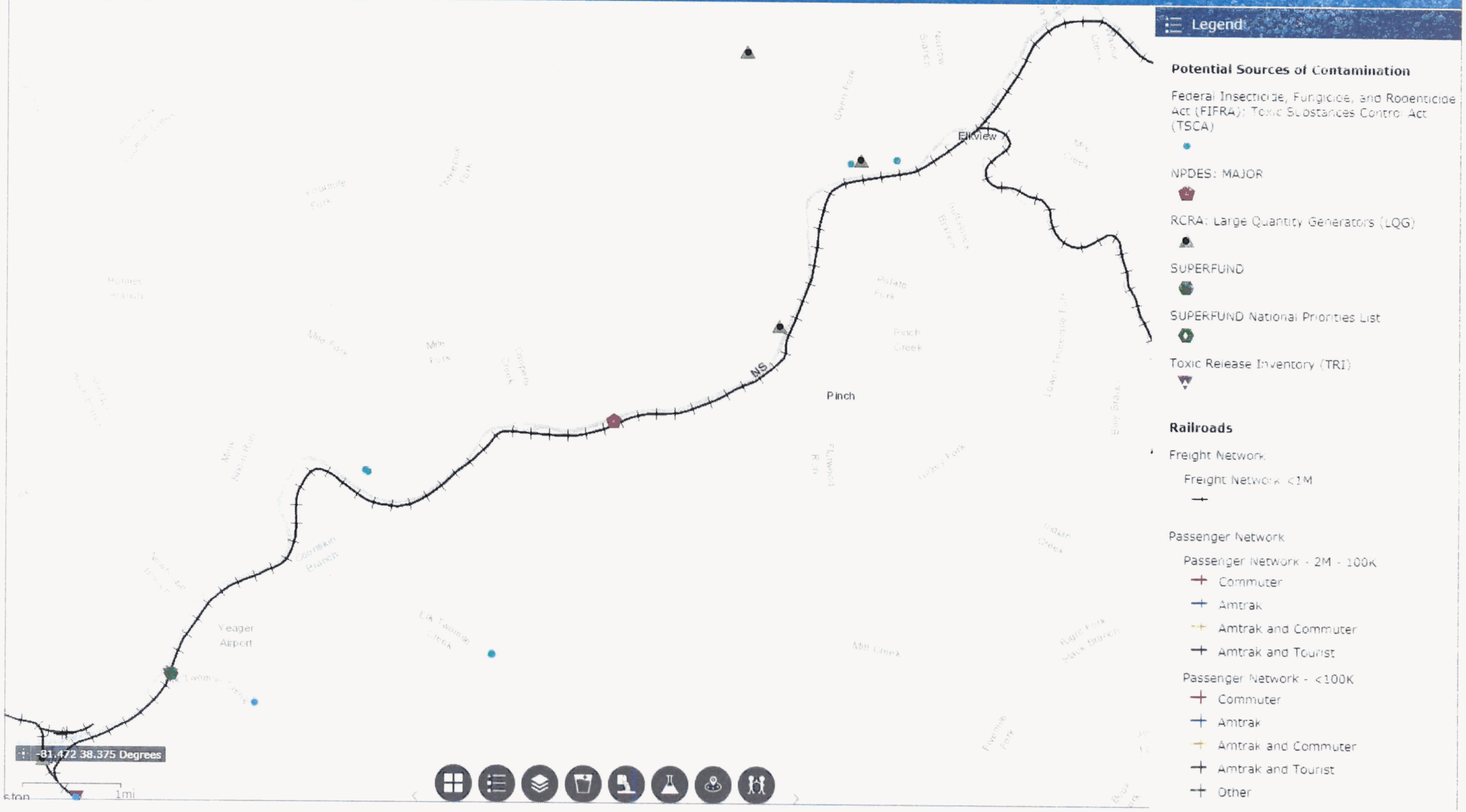
Figure 1:
Mapped Delineation Zones

WEST VIRGINIA AMERICAN WATER



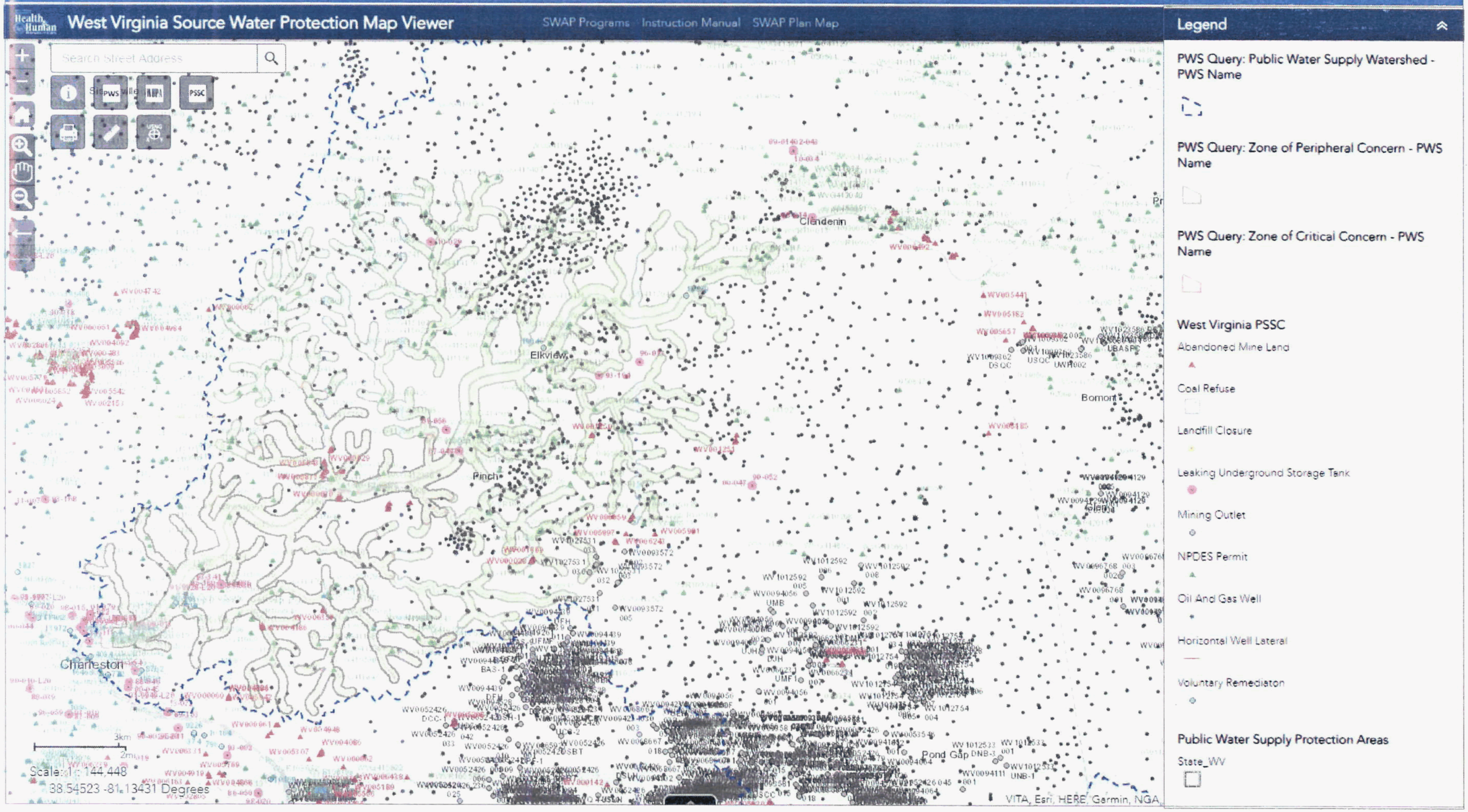
Basemap Source: Esri World Street Map. Delineation zones were provided by WVBPH.

Figure 2:
Federal PSSC Data (DWMAPS)



Source: *Screen shot accessed from https://geopub.epa.gov/DWWidgetApp/ on March 14, 2019.*

Figure 3:
State PSSC Data (WVBPH)



Source: Screen shot accessed from https://oehsportal.wvdhhr.org/wvswap/index.html on March 14, 2019.

Appendices

Appendix A

Stakeholder Engagement & Feedback

West Virginia American Water
Updated 2019 Source Water Protection Plans
Public Engagement Activities

Summary

As part of West Virginia American Water's (WVAW) continuing efforts to engage the public on source water protection concepts and management activities, two sets of public engagement activities were conducted. The purpose of these engagement activities was to share information about the updated 2019 Draft Source Water Protection Plans ("SWPPs" or "Plans") and obtain feedback from the public on suggested changes or potential sources of contamination. The Draft SWPPs were made available to the public on WVAW's website in early-April 2019. Updates to the SWPPs meet requirements set forth in West Virginia Senate Bill 373. WVAW plans to submit the plans in June 2019.

Four webinars were held on April 23 and 24, 2019 during the afternoons and evenings, respectively (see Section 1). In May 2019, WVAW held eight in-person public meetings to discuss the updated SWPPs for each of the eight WVAW systems. The meetings were advertised by WVAW using customer bill inserts, social media (i.e., Facebook and Twitter), press releases, news media announcements (e.g., Metro News) and targeted stakeholder email invitations. Public meeting attendance was minimal despite outreach efforts to encourage public participation (see Section 2).

Suggested changes to the SWPPs based on verbal feedback from participants are below. Attendance numbers and questions and answers for each session are also included below.

Section 1 – Webinars

Tuesday, April 23, 12:00 – 1:00 pm Webinar

No participants joined the webinar.

Tuesday, April 23, 6:00 – 7:00 pm Webinar
Total Participants: 1

Participant joined the webinar by phone only

No poll questions were answered

No questions were asked during the question & answer session

Wednesday, April 24, 12:00 – 1:00 pm Webinar
Total Participants: 4

2 participants joined the webinar by phone only

Participants that joined the webinar virtually:

- Justin Hannah, justin.hannah1@yahoo.com
- Paul McDanald, pmcdanald@huntingtonsb.com
- Billie Suder, billiesuder@amwater.com

Poll 1

1. Where do you get your drinking water?

A. Bluefield	0/6 (0%)
B. Bluestone	0/6 (0%)
C. Gassaway	0/6 (0%)
D. Huntington	1/6 (17%)
E. Kanawha Valley	1/6 (17%)
F. New River	0/6 (0%)
G. Webster Springs	0/6 (0%)
H. Weston	0/6 (0%)
No Answer	4/6 (67%)

Poll 2

2. How did you find out about today's webinar?

A. Social Media (Facebook, Twitter)	2/6 (33%)
B. Bill Insert	0/6 (0%)
C. From a Friend	0/6 (0%)
D. Newspaper	0/6 (0%)
E. Other	0/6 (0%)
No Answer	4/6 (67%)

Poll 3

3. What component of the source water protection plan is most important to you?

A. Operational Information	0/8 (0%)
B. Potential Sources of Contamination	2/8 (25%)
C. Contingency/Communications Plan	1/8 (13%)
D. Management Initiatives	0/8 (0%)
E. Alternative Source Analysis	0/8 (0%)
No Answer	5/8 (63%)

Q&A

Paul McDanald: As natural gas becomes less expensive per BTU than coal do you expect to see any impact on source water quality?

Response:
So Paul, what I think what you're getting at here is any impact associated with pollution that could be related to increased production of natural gas, and if I'm wrong you can correct me when we open up the phone lines in just a moment. From my perspective, I'm not necessarily sure. But what I do know is that West Virginia American Water considers all of these operations when they're determining priority PSSCs. So what that means is that they're taking a look at the expansion of various natural gas operations when determining which facilities would be on the list of potential sources of significant contamination and working with those folks so that they understand potential source water quality impacts. In addition, West Virginia American Water utilizes federal and state databases to gather information relating to pipeline operations, and they've have had some success with direct contact including participation in pipeline safety training. And so I hope that that answers your question. In addition, any pipeline related spill notifications are reported to the West Virginia DEP spill hotline, and they would be received directly by West Virginia American Water.

Paul McDanald: Yes, it does answer my question. Thanks.

Wednesday, April 24, 6:00 – 7:00 pm Webinar

No participants joined the webinar.

Section 2 – In-person public meetings

May 20th 11:30 am – 1:00 pm – Southern Operating Area

Participants

Steve Lipscomb, Summers County Emergency Management

Tim Farley, Mercer County Emergency Management

Discussion/Questions

- General discussion about people who drive vehicles into the reservoir – specifically Key Reservoir.
- Have there been any changes to the Bluestone plant recently?
    - There has been normal routine maintenance and upgrades, such as upgrades to the plant's SCADA system.
- Are there any plans for line replacements or expansion?
    - There are a lot of replacements occurring. WVAW provided examples.

Other

A participant worked with a WVAW representative to identify a Potential Source of Significant Contamination (PSSC) using the ArcGIS based WVAW Source Water Protection Plan Contaminant Locator App.

May 20th 6:00 pm – 7:30 pm – Southern Operating Area

No public participation.

May 21st 11:30 am – 1:00 pm – Kanawha Valley

Participants

Keith Morris, WV Department of Health and Human Resources

Kathryn Miller, Kanawha County Emergency Management

Pam Carte, Kanawha County Emergency Management

David Armstrong, Kanawha County Emergency Management

Jake Flatley, Metro News

Discussion/Questions

- Who maintains and operates the Elk River stream gauge and what does it monitor?
  - USGS maintains and operates the gauge. It measures stream gauge and velocity.
- Can the public access the data?
  - The data are available publicly online through USGS' website.
- Kanawha County Emergency Management expressed interest in using the gauge. They did not know that it existed.
  - WVAW provided the USGS website for the Elk River gauge and mentioned that they could set-up a tour if there was interest.
- Will today's presentation be available?
  - It will be posted on WVAW's website, and WVAW will send a copy to Dave Armstrong at the Kanawha County Emergency Management.
- Kanawha County Emergency Management expressed appreciation for the relationship they have developed with WVAW and specifically, how Jeff Ferrell makes himself available and maintains open communication with the County staff.
  - WVAW reciprocated the appreciation and enjoys working closely with the County.

May 21st 6:00 pm – 7:30 pm – Kanawha Valley

Participants

Krista Scott, Citizen

Alex Thomas, Metro News

Discussion/Questions

- Who calls you or notifies you about PSSCs and potential spills?
  - Some people call WVAW directly. Notifications also come through the Department of Environmental Protection (DEP) Spill Hotline.
- Do you monitor the National Guard and other facilities in the hills? Citizens are concerned with what may be discharged from the hills.
  - WVAW has a good working relationship with the National Guard and the airport.
- Discussion of Chem-Kleen and general concerns of how to respond if a citizen notices a potential event.
  - WVAW recommends that citizens report potential events to the DEP Spill Hotline.
- Do you adjust your source water protection efforts based on changes in state water quality regulations?

  - WVAW must provide drinking water that meets federal and state regulations. WVAW will communicate any gaps in standards or science to regulators if needed. WVAW also comments on NPDES permits.

May 22nd 11:30 am – 1:00 pm – Huntington

Participants

Lewis Baker, WV Rural Water Association

Henry Hunt, Hydro Group, Inc.

Skip Edwards, Cabell Huntington Hospital

Discussion/Questions

- What is the likelihood/feasibility of providing 5-day raw water storage?
  - Feasibility is fairly low since it would require WVAW to provide a 120-million-gallon reservoir at a cost of $131.9 million.
- The groundwater alternative is described as not being feasible, however, Lewis Baker noted that they have not seen any groundwater exploration studies and no cost has been provided. The participant suggested that WVAW change the designation from "not feasible" to "ongoing investigation" and suggested WVAW explore the following questions: what would it cost to install Ranney collector wells; what are the cost savings to treat groundwater instead of surface water; would 30 years of these cost savings offset the installation cost of the Ranney wells.
- Discussions took place regarding the practice of riverbank filtration with the following key points:
  - WVAW is exploring this idea with their counterparts in other states. The counterparts mention that other state primacy agencies are scrutinizing riverbank filtration and there is now an extra burden of testing and documentation.
  - Other utilities use riverbank filtration: Louisville, Parkersburg, Heckler
  - The Ohio River has cleaned up a lot over the past few years.
  - If the source changes, WVAW would need to review the current treatment process to investigate whether it needs to be altered to treat groundwater (e.g., treatment procedures for increased manganese).
  - Louisville shut down their wells when there was a potential contamination event on the river but only for public perception.
  - WVAW looked at a pre-Ranney system for use in Huntington prior to 1988. It was determined that the sandy soil could not support the system.
    - Henry Hunt was a part of that process and he will check his correspondence as he remembers that the decision may have been due to a constraint of the well production compared to WVAW's build-out capacity.

Other

A participant worked with a WVAW representative to identify Potential Sources of Significant Contamination (PSSC) using the ArcGIS based WVAW Source Water Protection Plan Contaminant Locator App.

May 22nd 6:00 pm – 7:30 pm – Huntington

Participants

Robin Blakeman, Ohio Valley Environmental Coalition

Discussion/Questions

- Is this presentation the same as what was given during the webinars? Are the presentations available?
    - It is generally the same information. The presentation during the in-person meetings have system-specific information. A recording of the webinar presentation will be available on WVAW's website.
    - WVAW will email Robin the link to the webinars. Robin mentioned she will distribute the website link to her network.
- How did you advertise for these meetings?
    - WVAW released four press releases, advertised through Metro News, bill inserts, paid advertising, and sent out personalized emails to stakeholder groups.

May 23rd 11:30 am – 1:00 pm – Northern Operating Area

Participants

Randal Conrad, Braxton County Memorial Hospital

Discussion/Questions

- A commodity study was conducted approximately two or three years ago that found the highest material on the list being transported through Braxton County is flammable liquid (e.g., gasoline, diesel fuel). There is approximately 80,000 – 100,000 gallons of these materials being transported per day. The study was done on I-79, Route 19, and Route 5. Randal will forward a copy of the commodity study to Erica. If Erica does not receive an email in a few days, she is encouraged to check back in with him.
- John Hoffman with Braxton County is leading an emergency response drill. The drill has not yet been scheduled. It will most likely be a full-scale functional drill. Erica is on Randal's distribution list, so she will receive information as soon as it has been scheduled.
- Discussion about storage tanks next to the Go-Mart and what they may store.
- Is the town of Burnsville discussing acquisition plans with WVAW?
    - WVAW met with the town regarding a potential acquisition but WVAW has not heard anything since this meeting.
- Hospital has plans in place to conduct maintenance on shower and other water-using systems within the hospital. They have always had positive interactions with WVAW.
- WVAW is researching field test kits to detect for legionella, which causes legionnaires disease.
- The fire hydrant located closest to the emergency room may need service. The hospital runs three exercises each year that includes briefly opening and closing the hydrant. They find it very difficult to open and would appreciate if WVAW could send someone out to check on it.
    - WVAW will send someone to check on it.
- There was discussion regarding the Local Emergency Planning Committees and changes in eligibility requirements for Department of Homeland Security grant funding.

May 23rd 6:00 pm – 7:30 pm – Northern Operating Area

Participants

John Ciesla, Guardians of the West Fork Watershed

Sally Egan, Guardians of the West Fork Watershed

Discussion/Questions

- What are the alternative sources of supply identified for Weston? Are any of these alternatives under construction?
  - WVAW looked into secondary intakes, raw water storage, and interconnection with Buckhannon. WVAW is currently conducting additional feasibility and treatability studies and will need to get BPH involved before we make any decisions regarding alternative sources. There is currently no alternative source in Weston. WVAW can shut the intake if needed and they use activated carbon to bolster treatment if needed.
- Discussion regarding how the interstate is the largest threat to the Weston plant. WVAW has looked into using Stonewall Lake as a source.
- When is the plan update due?
  - June 30th. These public meetings are being held as one way to get more public input.
- Does WVAW test for bromides? Do you test at the intake or upstream?
  - Yes, we check all systems monthly. We test at the intake. We are trying to get a baseline.
  - Guardians of the West Fork Watershed monitors water quality at the Stonewall Lake.
- Discussion about WVAW's long-term plans to provide water to Webster Springs from Weston and provide service to additional areas.
- What is the biggest problem the Weston treatment plant faces in terms of water quality issues?
  - There have not been any water quality concerns the Weston plant has not been able to handle. We just won the best taste award at the AWWA sectional conference.
- WVAW offered the Guardians a tour of the Weston plant and mentioned that they look forward to working with the organization as they have common goals.
- Guardians has a few staff/volunteers and partners that help take care of 75 river miles. Partners include Fairmont State's Water Research Institute and WV Fish and Wildlife.
- Discussion regarding the Weston dam and who owns it. It would be helpful to place signage to warn boaters and to provide an area for boaters to portage their boats around the dam. There have been several dams removed around Clarksburg and they have seen water quality improvements since the removals.
- The Guardians mentioned that Lewis County First is a local non-profit that may be a worthwhile partner for WVAW.
- Do you conduct outreach with citizens?
  - WVAW conducts outreach including attending community events, sponsoring contests, developing and delivering watershed education at schools.
- Discussion regarding take-back programs and how to stop people from dumping trash.
- Are there any CSOs in Weston?
  - The Weston plant has not seen any issues related to CSOs.

Appendix B

Communications Plan

B-1 INTRODUCTION

B-1.1 Purpose

This plan provides guidance for West Virginia American Water (also referred to as "Company") to communicate with agencies and the public in case of a spill, contamination event, or other situation that poses a potential threat to public health and safety.

The procedures and responsibilities described in this plan apply to all West Virginia American Water public water systems. Specific contact details for individual systems are provided in the corresponding Facility Emergency Response Plan.

B-1.2 Regulatory Requirements

West Virginia Code §16-1-9c requires public water systems to develop a "communications plan that documents the manner in which the public water utility, working in concert with state and local emergency response agencies, shall notify the local health agencies and the public of the initial spill or contamination event and provide updated information related to any contamination or impairment of the source water supply or the system's drinking water supply, with an initial notification to occur in any event no later than thirty minutes after the public water system becomes aware of the spill, release or potential contamination of the public water system."

The West Virginia Bureau for Public Health (WVBPH) clarified this requirement through rulemaking (§64-3-14.6) for "initial notification to the public to occur in any event no later than thirty minutes after the public water system becomes aware that the spill, release or potential contamination of the public water system ***poses a potential threat to public health and safety***."

On July 1, 2002, the WVBPH adopted the federal public notice rule, which requires "...notice to the public for violations and other situations with significant potential to have serious adverse effects on human health as a result of short-term exposure." The West Virginia Department of Health and Human Resources has developed the following guidelines in the Manual of Environmental Health Procedures for public notification:

- DW-23: Boil Water Notices for Public Water Systems
- DW-37: Public Notices for Public Water Systems

In general, public notices are required for three types of situations: (1) acute violations or violations of water quality standards that are of an immediate concern; (2) other water quality violations; and (3) monitoring and/or reporting violations. The method and timing of public notification varies by situation, as detailed in DW-37. Procedure DW-23 provides specific guidance for Boil Water Notices (BWN) and Do Not Use (DNU) water notices.

B-2 ROLES AND RESPONSIBILITIES

The communication team listed in the attached summary for each water system will be responsible for working cooperatively with the Company management team and partner agencies to notify the public in a situation that poses a potential threat to public health and safety. The team will also provide updated information related to the situation as appropriate.

B-2.1 Designated Spokesperson

The Designated Spokesperson (or Designee) serves as the Public Information Officer (PIO) for the Company and is authorized to speak on behalf of the Company to partner agencies, the public, and the news media. The Company President or Designated Spokesperson may authorize and/or direct others to issue information that has been approved by the management team.

Additional responsibilities include:

- Announce risk level (using Tiers system) that applies to public notifications
- Issue news releases, updates, and other information regarding the incident/event using appropriate information venues (e.g., emergency notification systems, local news outlets, social media, website, etc.)
- Ensure that news releases are sent to local health agencies and the local news media in the affected area
- Respond to questions from the news media and others regarding the incident / event
- Participate in news conferences and interviews to provide information and updates, as available and appropriate

B-2.2 Supporting Roles

Other members of the communication team are expected to be familiar with the plan and provide support throughout the public notification and event response process, including coordinating with the management team to:

- Collect information needed to investigate, analyze, and characterize the incident / event
- Provide information to the management staff to support response decisions and actions
- Assist the management staff in handling event response and communication duties

Supporting team members are not authorized to speak on behalf of the Company unless designated by the Designated Spokesperson or President.

B-2.3 Interagency Coordination

The Designated Spokesperson, President and other members of the communication team will coordinate with PIOs from other agencies on statements, updates, joint press conferences, etc. as needed. Message coordination between emergency response agencies, health agencies and water utilities is important when responding to an incident/event.

B-3 COMMUNICATION PROCEDURES

B-3.1 TIERS Reporting System

West Virginia American Water intends to use the *Tiered Incident / Event Reporting System* (TIERS) as established by WVBPH for communicating with agencies and the public in situations that may threaten water quality. TIERS provides a multi-level notification framework, which escalates the communicated threat level commensurate with the drinking water system risks associated with a particular incident or event. The five-tiered **A-B-C-D-E** risk-based incident response communication format is summarized in the following table.

TIERS Reporting Categories

Tier	Category	Risk Level	Tier Summary
A	Announcement	Low	The water system is issuing an announcement to the public and public agencies about an incident or event that may pose a threat to public health and safety. Additional information will be provided as it becomes available.
B	Boil Water Advisory	Moderate	Water system users are advised to boil any water to be used for drinking or cooking, due to possible microbial contamination. The system operator will notify users when the boil water advisory is lifted.
C	Cannot Drink	High	System users should not drink or cook with the water until further notice. The water can still be used for showering, bathing, cleaning, and other tasks. More information on this notice will be provided as soon as it is available.
D	Do Not Use	Very High	The water should only be used for flushing commodes and fire protection until further notice. More information on this notice will be provided as soon as it is available.
E	Emergency	Extremely High	The water should not be used for any purpose until further notice. More information on this notice will be provided as soon as it is available.

The terminology used in the above table is based on that used by WVBPH. Risk levels for each TIERS category are general in nature and do not represent the actual risk level for a specific incident. Communication templates for each TIERS category are attached and discussed in Section 3.3.

B-3.2 Communication Flow Chart

The attached flow chart illustrates how the Company plans to respond when it receives a report that a spill, release, or other contamination event may have occurred.

Upon initial notification of the incident/event, managers and operators will collect information and verify the need for further investigation. If there is an indication that the incident/event poses a risk to public health and safety, and the initial facts about the incident support it, the Company will issue a public notification consistent with the threat level based on available information. The initial notification will be provided by the Designated Spokesperson (or Designee) to the public and local health agencies within thirty (30) minutes of determining that the incident/event poses a potential risk to public health and safety.

In addition to issuing a notice, Company personnel and partner agencies will continue to investigate and characterize the threat and communicate updates as appropriate. Several iterative cycles may occur after the initial threat assessment including further investigation, response actions, and elimination or mitigation of the threat resulting in a return to normal operations. Communication activities during this period will include:

- Initial notification using TIERS advisory levels
- Notification to the Company's source water protection and communication teams
- Periodic information updates for agencies and the media/public as information becomes available
- Modifications to the applicable advisory tier, as necessary

After the threat level is reduced and operations return to normal, the Company will review communications regarding the incident/event and modify the plan, if appropriate.

B-3.3 Core Messages and Actions

Clear, consistent, and timely messages are important for effectively communicating information about an incident/event with the public. These messages should include only relevant information and clear actions presented in positive terms (e.g., "stay calm" instead of "don't panic"). Repeating a message often helps the audience retain the information.

<u>Message Development</u>

- What happened? (who, what, where, why, when, how)
- What is being done to address it?
- What are the health impacts, if any?
- What are customers instructed to do, if anything?
- When and where will information updates be available?
- When will the problem be resolved?

WVBPH has developed a series of templates for developing messages associated with each TIERS advisory level. The Center for Disease Control (CDC) has also developed a template that can be used in

any type of emergency and includes guidelines for risk communication principles and message components. These templates are attached for reference; however, messages will be developed based on the circumstances present at the time.

Message coordination between emergency response agencies, health agencies and water utilities is important when responding to an incident/event. As often as possible, announcements and updates should be made jointly by the Company and its local, regional, state and/or federal partners.

Key points when communicating during an incident/event include the following:

- The health and safety of our customers and our employees is our number one priority.
- We appreciate the patience of our customers as we work to understand and resolve the situation.
- Our team is working on the matters we have identified so far, with the information available to us at this time.
- Our source water protection team and our employees are working very hard to investigate the situation and will help provide possible resolutions to matters we find during the investigation.
- We are working with our partners at the local, state, and federal level to resolve the situation as quickly and as safely as we can.
- We are focused on dealing with the situation based on the facts available to us at this time; we are not in a position to speculate about a variety of possible scenarios that do not exist presently.
- We welcome any information people may have on the situation we are investigating today.

B-3.4 Communication Methods

Communications with the public may be provided by several different methods depending on the situation. The Company will notify customers potentially affected by an incident/event using one or more of the following options:

- Emergency customer notification system (phone, text and email)
- Local media (press release, press conference, updates)
- County emergency alert system where available
- Website and social media (Facebook, Twitter)
- Door-to-door/door hangers
- Posted notices

Primary and alternate designated locations for media interviews and/or press conferences are identified in the attached summary for each water system. The location(s) selected may vary based on the circumstances of an incident/event and will be communicated to the media as a situation develops.

B-4 ACRONYMS

BWN	Boil Water Notice
CDC	Center for Disease Control
DNU	Do Not Use

PIO	Public Information Officer
TIERS	Tiered Incident / Event Reporting System
WVBPH	West Virginia Bureau for Public Health

B-5 ATTACHMENTS

The following attachments to this Communications Plan provide additional resources:

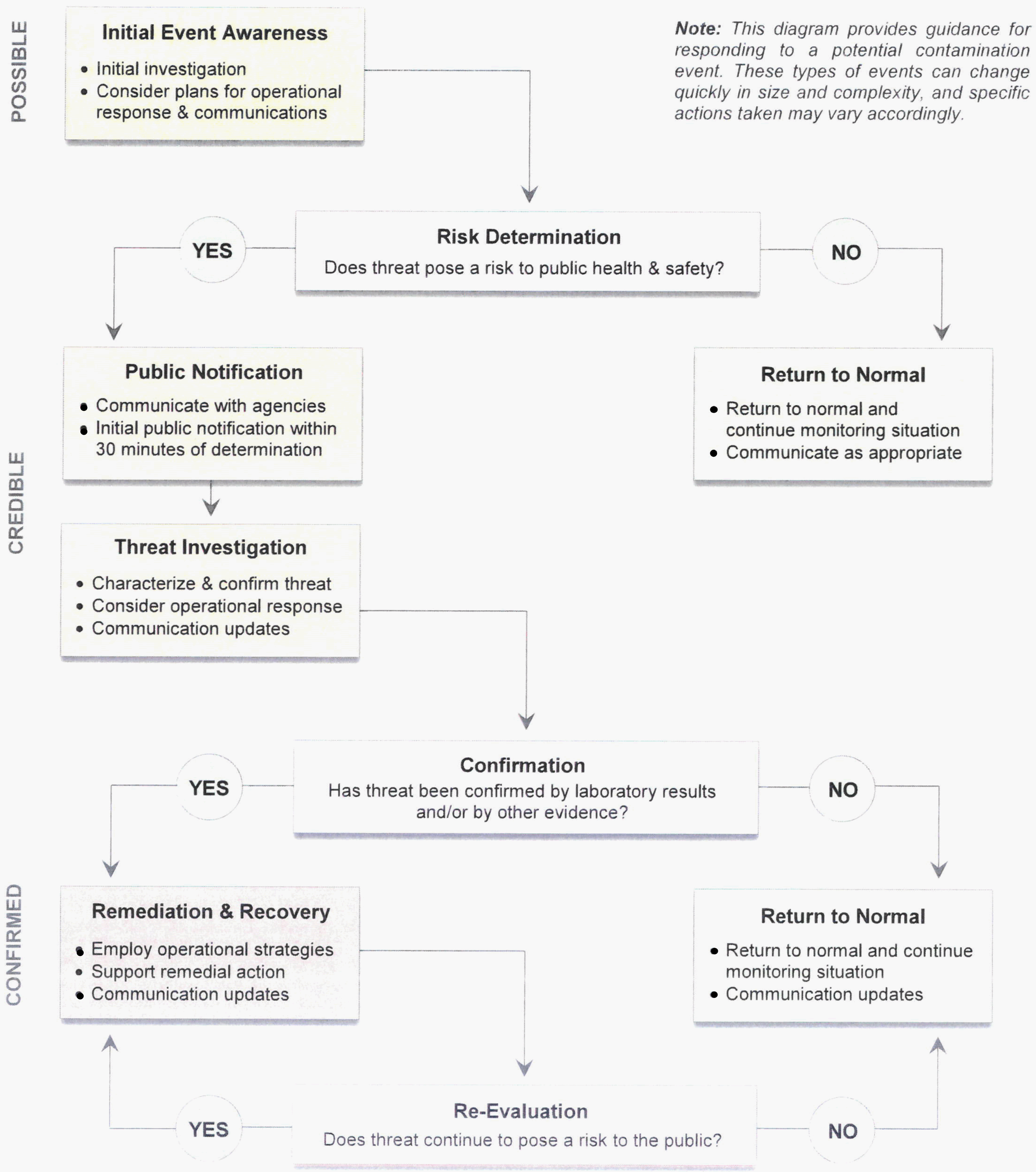
- Attachment B-1: Event Response Flow Chart
- Attachment B-2: Core Message Templates

Communications Plan Attachment B-1

EVENT RESPONSE FLOW CHART

WEST VIRGINIA
AMERICAN WATER

Note: *This diagram provides guidance for responding to a potential contamination event. These types of events can change quickly in size and complexity, and specific actions taken may vary accordingly.*



Communications Plan Attachment B-2

PUBLIC NOTIFICATION PHONE MESSAGE SCRIPT

The following is an important message from West Virginia American Water. A possible contamination event has occurred and poses a potential threat to your local water system. West Virginia American Water was notified of a [description of incident] that has entered the [source water name], which is the source of your local water supply. Public water systems are required by state law to notify the public within 30 minutes after determining that the incident poses a risk to public health and safety. We are working with [emergency responders/state health officials/agency names] to gather critical information needed to determine the risk to the water system and the appropriate response actions, if necessary. We will provide an update as soon as more information is available. No drinking water advisories have been issued at this time. Thank you for your attention to this message as we work to ensure the quality of your water. No additional information is available at our customer service center at this time.

Communications Plan Attachment B-2

UTILITY ISSUED NOTICE – LEVEL A
PUBLIC WATER SYSTEM ANNOUNCEMENT

A WATER SYSTEM INVESTIGATION IS UNDERWAY

On _________ at ___:____ AM/PM, the ________________________________ Water System began investigating an incident that may affect local water quality.

The incident involves the following situation at this location:
____
____
____

There are no restrictions on water use at this time. As always, if water system customers notice anything unusual about their water – such as abnormal odors, colors, sheen, etc. – they should contact the water system at _______________________.

At this time there is no need for concern if you have consumed or used the water.

Regular updates will be provided about this Announcement as water system staff continue their investigation. Again, there are no restrictions on water use at this time.

State Water System ID# ________________________ Date Distributed: ________________________

Reference: TIERS Advisory Templates, WVBPH, January 2016

Communications Plan Attachment B-2

UTILITY ISSUED NOTICE – LEVEL B
BOIL WATER ADVISORY

A BOIL WATER ADVISORY IS IN EFFECT

On _________ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:
□ Entire Water System or □ Other: ____
____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER WITHOUT BOILING IT FIRST.** Bring all water to a boil, let it boil for one minute, and let it cool before using, or use bottled water. Boiled or bottled water should be used for drinking, making ice, brushing teeth, washing dishes, bathing, and food preparation **until further notice**. Boiling kills bacteria and other organisms in the water.

What happened?

- **The problem is related to** ____

What is being done?

- **The water system is taking the following action:**
  ____
  ____

What should a customer do if they have consumed or used the water?

- ____

We will inform you when you no longer need to boil your water. We anticipate resolving the problem within __________ hours/days. For more information, please contact ______________________ at ______________ or ___________________ at ______________________.

General guidelines on ways to lessen the health risk are available from the EPA Safe Drinking Water Hotline at 1 (800) 426-4791.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

State Water System ID# ________________________ Date Distributed: ______________________

Reference: TIERS Advisory Templates, WVBPH, January 2016

Communications Plan Attachment B-2

UTILITY ISSUED NOTICE – LEVEL C
"CANNOT DRINK" WATER NOTIFICATION

A LEVEL C WATER ADVISORY IS IN EFFECT

On _________ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:
☐ Entire Water System or ☐ Other: ____

____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** You can't drink the water, but you can use it for showering, bathing, toilet-flushing, and other non-potable purposes.

- **BOILING WILL NOT PURIFY THE WATER.** Do not drink the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** ____

What is being done?

- **The water system is taking the following action:**

  ____

  ____

What should a customer do if they have consumed or used the water?

- ____

We will inform you when the water is safe to drink. We anticipate resolving the problem within ________ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact ______________ at __________ or _________________ at ______________________.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

State Water System ID# ________________________ Date Distributed: _______________________

Reference: TIERS Advisory Templates, WVBPH, January 2016

Communications Plan Attachment B-2

UTILITY ISSUED NOTICE – LEVEL D
"DO NOT USE" WATER NOTIFICATION

A LEVEL D WATER ADVISORY IS IN EFFECT

On ________ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:
□ Entire Water System or □ Other: ____

____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** The water is contaminated.
- **DO NOT SHOWER OR BATHE IN THE WATER.** You can't use the water for drinking, showering, or bathing. It can be used for toilet flushing and firefighting.
- **BOILING WILL NOT PURIFY THE WATER.** Do not use the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** ____

What is being done?

- **The water system is taking the following action:**

  ____

  ____

What should a customer do if they have consumed or used the water?

- ____

We will inform you when the water is safe to drink. We anticipate resolving the problem within ________ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact __________ at _________ or ___________ at ______.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

State Water System ID# ______________________ Date Distributed: _____________________

Reference: TIERS Advisory Templates, WVBPH, January 2016

Communications Plan Attachment B-2

UTILITY ISSUED NOTICE – LEVEL E
EMERGENCY WATER NOTIFICATION

A LEVEL E WATER ADVISORY IS IN EFFECT

On _________ at ___:____ am/pm, a water problem occurred causing contamination of your water. The areas that are affected are as follows:
☐ Entire Water System or ☐ Other: ____

____

CONDITIONS INDICATE THERE IS A HIGH PROBABILITY THAT YOUR WATER IS CONTAMINATED. TESTING HAS NOT OCCURRED TO CONFIRM OR DENY THE PRESENCE OF CONTAMINATION IN YOUR WATER.

What should I do?

- **DO NOT DRINK THE WATER.** The water is contaminated.
- **DO NOT USE THE WATER FOR ANY PURPOSE!** You can't use the water for drinking, showering, or bathing, or any other use – not even for toilet flushing.
- **BOILING WILL NOT PURIFY THE WATER.** Do not use the water, even if it is boiled. The type of contamination suspected is not removed by boiling.

What happened?

- **The problem is related to** ____

What is being done?

- **The water system is taking the following action:**
  ____
  ____

What should a customer do if they have consumed or used the water?

- ____

We will inform you when the water is safe to drink. We anticipate resolving the problem within _________ hours/days. For more information – or to report unusual water conditions such as abnormal odors, colors, sheen, etc. – please contact ___________ at __________ or ____________ at _______.

Please share this information others who use this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

State Water System ID# ________________________ Date Distributed: _______________________

Reference: TIERS Advisory Templates, WVBPH, January 2016

Message Development for Communication

First, consider the following:

Audience:	Purpose of Message:	Method of delivery:
❑ Relationship to event ❑ Demographics (age, language, education, culture) ❑ Level of outrage (based on risk principles)	❑ Give facts/update ❑ Rally to action ❑ Clarify event status ❑ Address rumors ❑ Satisfy media requests	❑ Print media release ❑ Web release ❑ Through spokesperson (TV or in-person appearance) ❑ Radio ❑ Other (e.g., recorded phone message)

Six Basic Emergency Message Components:

1. **Expression of empathy:** ______________________________

____

2. **Clarifying facts/Call for Action:**

Who ______________________________

What ______________________________

Where ______________________________

When ______________________________

Why ______________________________

How ______________________________

3. **What we do not know:** ______________________________

4. **Process to get answers:** ______________________________

5. **Statement of commitment:** ______________________________

6. **Referrals:** ______________________________

For more information ______________________________

Next scheduled update ______________________________

Finally, check your message for the following:

Positive action steps Honest/open tone Applied risk communication principles Test for clarity Use simple words, short sentences	Avoid jargon Avoid judgmental phrases Avoid humor Avoid extreme speculation

Reference: Center for Disease Control, Crisis and Emergency Risk Communications, Version 15.0908

Appendix C

Emergency Response Plan Certification

WEST VIRGINIA
AMERICAN WATER

Emergency Response Plan Certification Statement

I certify that the West Virginia American Water Kanawha Valley Water System (PWSID WV3302016) has an emergency response plan[1] in place in accordance with the Public Health Security Bioterrorism Preparedness & Response Act of 2002 that was last updated in January 2016.

The plan covers the following areas identified by WVBPH: emergency response team, emergency communications, list of sensitive populations, list of major users, personnel and property protection measures, training, resource inventory, repair and supply providers, and procedures for specific emergency incidents.

[signature]	Robert Burton
Signature of Responsible Party or Designee	Name of Authorized Signatory
6-18-2019	President
Date Signed	Title of Authorized Signatory

[1] West Virginia American Water refers to this document as an Emergency Preparedness Manual.

Appendix D

Summary of Alternate Source of Supply Feasibility Report

On March 8, 2014, West Virginia's Senate passed Senate Bill No. 373 which was an act to amend and reenact sections under Chapter 16 of the Code of West Virginia which deals with Public Health. West Virginia American Water (WVAW) solicited the support of American Water's Business Services Engineering group in meeting some of the requirements in the Bill, specifically the following sections:

§16-1-9c. Required update or completion of source water protection plans.

(a) On or before July 1, 2016, each existing public water utility which draws and treats water from a surface water supply source or a surface water influenced groundwater supply source shall submit to the commissioner an updated or completed source water protection plan for each of its public water system plants with such intakes to protect its public water supplies from contamination. Every effort shall be made to inform and engage the public, local governments, local emergency planners, local health departments and affected residents at all levels of development of the protection plan.

(b) The completed or updated plan for each affected plant, at a minimum, shall include the following:

2) An examination and analysis of the public water system's ability to isolate or divert contaminated waters from its surface water intake or groundwater supply, and the amount of raw water storage capacity for the public water system's plant;

3) An examination and analysis of the public water system's existing ability to switch to an alternative water source or intake in the event of contamination of its primary water source;

4) An analysis and examination of the public water system's existing ability to close its water intake in the event the system is advised that its primary water source has become contaminated due to a spill or release into a stream, and the duration of time it can keep that water intake closed without creating a public health emergency;

5) The following operational information for each plant receiving water supplies from a surface water source:

A. The average number of hours the plant operates each day, and the maximum and minimum number of hours of operation in one day at that plant during the past year; and

B. The average quantities of water treated and produced by the plant per day, and the maximum and minimum quantities of water treated and produced at that plant in one day during the past year;

6) An analysis and examination of the public water system's existing available storage capacity on its system, how its available storage capacity compares to the public water system's normal daily usage and whether the public water system's existing available storage capacity can be effectively utilized to minimize the threat of contamination to its system;

9) If the public water utility's water supply plant is served by a single-source intake to a surface water source of supply or a surface water influenced source of supply, the submitted plan shall also include an examination and analysis of the technical and economic feasibility of each of the following options to provide continued safe and reliable public water service in the event its primary source of supply is detrimentally affected by contamination, release, spill event or other reason:

   A. Constructing or establishing a secondary or backup intake which would draw water supplies from a substantially different location or water source;

   B. Constructing additional raw water storage capacity and/or treated water storage capacity, to provide at least two days of system storage, based on the plant's maximum level of production experienced within the past year;

   C. Creating or constructing interconnections between the public water system with other plants on the public water utility system or another public water system, to allow the public water utility to receive its water from a different source of supply during a period its primary water supply becomes unavailable or unreliable due to contamination, release, spill event or other circumstance;

   D. Any other alternative which is available to the public water utility to secure safe and reliable alternative supplies during a period its primary source of supply is unavailable or negatively impacted for an extended period; and

   E. If one or more alternatives set forth in paragraphs (A) through (D) of this subdivision is determined to be technologically or economically feasible, the public water utility shall submit an analysis of the comparative costs, risks and benefits of implementing each of the described alternatives.

The requirements described above were evaluated for each of the following WVAW systems:

- Kanawha Valley
- Huntington
- New River
- Bluestone
- Bluefield
- Weston
- Webster Springs
- Gassaway

Note that §16-1-9c-(b)-(1), (7), (8), and (10) through (13) are not included here because these sections are addressed separately in the source water protection plan.

APPENDIX D SUMMARY OF ALTERNATE SOURCE OF SUPPLY FEASIBILITY REPORT

Responses to §16-1-9c-(b)-(2) through (6) for each system include specific operational information that is considered confidential for security reasons. These details are not included in this summary but will be submitted to WVBPH. In general, each WVAW system can typically prevent contamination from reaching the water treatment plants by closing valves on intake pipes and/or shutting off the raw water pumps. The duration of time that the water intake could be closed before the system would run out of clean water depends on the amount of finished water storage available in each system at the time of a plant shutdown. The actual amount of storage that may be used at any given time can vary based on location, water quality conditions, and other operational considerations.

In response to the requirements under §16-1-9c-(b)-(9), an analysis of alternative sources of supply was conducted for each system. In general, each system was evaluated to determine if there were feasible alternatives for the following supply sources:

- Alternate intake;
- Interconnection with nearby water systems;
- Raw water storage; and
- Groundwater.

For the raw water storage evaluation, the feasibility of installing sufficient raw water storage to be able to supply five (5) days of plant capacity to the treatment plant was assessed instead of the two days required by §16-1-9c. This approach was taken due to the potential amount of time that a plant could be out of service in the event of a chemical spill or catastrophic event. In general, finished water storage was not considered in the evaluation due to the amount of storage this would entail and the water quality concerns associated with a high water detention time of finished water in the system.

For each system, a high level preliminary design was developed for each alternative, when feasible. Over the past several years, WVAW has been considering interconnecting the Bluestone system with the Bluefield system and retiring the Ada WTP which serves the Bluefield system. Similarly, the interconnection of the Weston system with the Webster Springs system and retirement of the Webster Springs WTP has been under consideration. These projects have multiple benefits to the company and its customers. Therefore, for the purposes of the alternative supply analysis, it was assumed that these systems would be interconnected as noted and the alternative supply was sized to be sufficient to supply both interconnected systems.

The preliminary design included sizing calculations for equipment and pipes, identification of potential locations for new facilities, and layouts for potential pipeline routes. Conceptual level capital and O&M cost estimates were prepared for each alternative.

The alternatives were then ranked using a quantitative evaluation method developed by American Water. The purpose of this evaluation process was to rank the available alternatives against each other, not necessarily to identify a single feasible solution. Criteria for the evaluation were selected to evaluate each

alternative based on the West Virginia Bureau of Public Health (WVBPH) Feasibility Study Guidance Document and American Water's prior experience with alternatives evaluations.

A pair-wise comparison was performed to develop a weighting from 1 to 10 for each criterion with 10 being the most important. For each system, each potentially feasible alternative was given a score from 1 to 5 for each criterion with 5 representing the most favorable rating. The score was multiplied by the weight for each criterion and these were added together to develop a benefit score for each alternative. It should be noted that the benefit score does not include cost of the project. Each benefit score was then divided by an annualized life cycle cost to determine the benefit/cost score for each alternative. The advantage of this method of evaluation is that it allows for the alternatives with the highest benefits to be identified without the bias of costs.

The alternatives with the highest benefit and/or benefit/cost score for each system are presented in Attachment D-1 along with the estimated costs and the benefits and risks associated with the selected alternative. For the Huntington and Gassaway systems, two alternatives are presented because the feasibility of implementing the lowest cost alternative for each is unknown.

Attachment D-1 also shows the rate impact as a percentage of rate increase to customers for each of the selected alternatives based on WVAW's 2019 rate structure. Since WVAW has single tariff pricing the impact of the projects were evaluated together to determine the impact to customers. If all of the projects that are discussed in the table were to be implemented, this would result in an estimated rate increase between 13.2% and 15.4% for all WVAW customers.

In 2018, WVAW filed an expanded version of the Kanawha Valley Alternate Source of Supply Feasibility Report. The expanded report incorporated Potesta & Associates' findings in the Raw Water and Sediment Study Report for the Kanawha River and considered feasibility of finished water storage as a potential alternative, in addition to the previously identified alternatives. Project costs were updated from 2015 to 2018 dollars. Accordingly, the rate impact to the customer was also updated to reflect the new costs.

Preparations for additional feasibility studies, including treatability, are currently underway.

Attachment D-1: Summary of Alternative Supply Analysis

System	Alternative with Highest Feasibility or Benefit/Cost Score	Estimated Capital Cost (millions)	Estimated O&M Cost (annual)	Rate Impact (%)	Benefits	Risks
Bluestone and Bluefield[1]	37.5 MG Raw Water Storage	$42.9	$46,631	2.9%	• Alternative supply would be available with minimal operator effort • No additional treatment facilities required • Land appears to be available near the Bluestone WTP for reservoir so minimal environmental and customer impacts	• Land identified for raw water storage may not be available for use • Higher water table than anticipated could add to the costs for dewatering and/or elevation of the tanks • Limited supply capacity (5 days) with limited capability of expansion
Gassaway	3.9 MG Raw Water Storage	$9.2	$17,791	0.6%	• Alternative supply would be available with minimal operator effort • No additional treatment facilities required • Land appears to be available at Gassaway WTP for raw water storage so minimal environmental and customer impacts • Low safety risk since tank will be on plant site	• Higher water table than anticipated could add to the costs for dewatering and/or elevation of the tanks • Limited supply capacity (5 days) with limited capability of expansion
Gassaway	Develop Groundwater Wells	$1.1	$16,591	0.08%	• Alternative supply would be available with minimal operator effort • No additional treatment facilities required • Land appears to be available at Gassaway WTP for wells so minimal environmental and customer impacts • Low safety risk since wells will be on plant site	• Groundwater availability is unknown without extensive groundwater investigations • Long term availability of supply is not known • Permitting for groundwater allocation may be a lengthy process
Huntington	New Intake on Guyandotte River	$35.0	$109,858	2.4%	• Alternative supply would be available with minimal operator effort • No additional treatment facilities required • Low safety risk • Minor environmental impacts • Fully redundant supply with opportunity for capacity expansion • Guyandotte River was approved for temporary supply in 2015	• Outfalls and other obstacles along river bank not identified; may require additional time and cost to avoid conflicts • Survey of the river bottom was not yet completed for this feasibility study • Availability of property for intake and raw water pump station could affect the cost of this alternative • Upgrades may be required if the source water is not found to be suitable for treatment at the existing WTP
Huntington	Industrial Intake	$10.4	$0	0.7%	• Alternative supply would be available with minimal operator effort • No additional treatment facilities required • Low safety risk • Minor environmental impacts • Relatively low customer impact during construction • Guyandotte River was approved for temporary supply in 2015	• Owner of intake may not be amenable to a connection with their intake and pump station or agreement for use may become invalid if ownership changes hands in the future • Existing raw water pumps may not be sufficient for transferring water to the Huntington WTP • Alternate pipeline route may be required due to construction or permitting issues • Owner of intake may require the use of their intake during the time it is needed by WVAW • Upgrades may be required if the source water is not found to be suitable for treatment at the existing WTP • Intake not owned by WVAW so may not be expandable if additional supply is needed in the future

Attachment D-1: Summary of Alternative Supply Analysis

Continued from previous page

System	Alternative with Highest Feasibility or Benefit/Cost Score	Estimated Capital Cost (millions)	Estimated O&M Cost (annual)	Rate Impact (%)	Benefits	Risks
Kanawha Valley	Intake on Kanawha River	$62.8	$420,823	4.4%	• Alternative supply would be available with minimal operator effort • No additional treatment facilities required • Low safety risk • Minor environmental impacts • Fully redundant supply with opportunity for capacity expansion • Sampling program is underway to assess water quality	• Outfalls and other obstacles along river bank not identified; may require additional time and cost to avoid conflicts • Survey of the river bottom was not yet completed for this feasibility study • Availability of property for intake and raw water pump station could affect the cost of this alternative • Significant traffic control may be required for the microtunneling trench excavations • Kanawha River sediment may be contaminated; dredging and barge traffic may disturb the sediment and release it into the river • Upgrades may be required if the source water is not found to be suitable for treatment at the existing WTP
New River	20 MG Raw Water Storage	$25.0	$76,245	1.7%	• Alternative supply would be available with minimal operator effort • No additional treatment facilities required	• Land identified for raw water storage may not be available for use • Higher water table than anticipated could add to the costs for dewatering and/or elevation of the tanks • Limited supply capacity (5 days) with limited capability of expansion
Weston and Webster Springs[2]	20 MG Raw Water Storage	$51.4	$31,382	3.4%	• Alternative supply would be available with minimal operator effort • No additional treatment facilities required • Land appears to be available near the Weston WTP for reservoir so minimal environmental and customer impacts	• Land identified for raw water storage may not be available for use • Higher water table than anticipated could add to the costs for dewatering and/or elevation of the tanks • Limited supply capacity (5 days) with limited capability of expansion
Total Estimated Cost[3]		$193.6 to $226.2	$591,672 to $702,730	13.2% to 15.4%		

Notes:
1 – Cost includes interconnection of Bluestone and Bluefield systems
2 – Cost includes interconnection of Weston and Webster Springs systems
3 – Cost represents range with two alternatives for Gassaway and Huntington because the feasibility of implementing the lowest cost alternative for each is unknown

Appendix E

Implementation Progress Report

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March 13, 2018

Source Water Protection Unit
West Virginia Bureau for Public Health
Office of Environmental Health Services
350 Capitol Street, Room 313
Charleston, WV 25301-3713

RE: Source Water Protection Plan Implementation Progress Report – 2017

Dear Colleagues:

West Virginia American Water (WVAW) has prepared this report to provide you with an update on Source Water Protection Plan (SWPP) implementation activities conducted in 2017 for the eight systems with surface water intakes that we operate across the state:

- WV3300406 – Gassaway Water System (SWPP approved October 24, 2016)
- WV3300608 – Huntington Water System (SWPP approved October 24, 2016)
- WV3301046 – New River Water System (SWPP approved December 19, 2016)
- WV3302016 – Kanawha Valley System (SWPP approved December 19, 2016)
- WV3302104 – Weston Water System (SWPP approved October 24, 2016)
- WV3302835 – Bluefield Water System (SWPP approved October 27, 2016)
- WV3304513 – Bluestone Water System (SWPP approved October 27, 2016)
- WV3305104 – Webster Springs Water System (SWPP approved October 24, 2016)

Although status reports are not required by W.Va. Code §16-1-9c, we consider it important to share our progress to date in the interest of transparency and open communication of successes and challenges related to source water protection. The following report covers the 2017 calendar year, which represents the first full year of implementation since our plans were approved by West Virginia Department of Health and Human Resources (WVDHHR).

IMPLEMENTATION STATUS

Each WVAW SWPP includes a management plan that identifies specific activities that we are pursuing, in cooperation with appropriate agencies and emergency response organizations, to understand and mitigate potential impacts of contamination of source water supplies. The types of activities are the same for all of our systems; however, the details and implementation vary by location based on site-specific risks and resources.

The management plans consist of five key strategies: source management, source water monitoring, contingency planning, outreach and education, and providing input on policies and regulations. The corresponding activities listed under these strategies are all On Track for each of our systems. See the following summary and attached tables for more information about our progress on these activities.

Source Management (Potential Sources of Significant Contamination or PSSCs)

- Conducted outreach to priority PSSC facilities and tracked responses in geospatial database. See Table 1 for progress on PSSC communications. Example flyer provided (Attachment A).
- Compiled and reviewed reference information for substances reported to exist at upstream facilities based on regulatory records (e.g., aboveground storage tank notifications).
- Communicated progress and challenges related to source water protection with regulatory agencies through this update and other direct means (email, phone, meetings).
- Effectively managed chemicals in our own operations through implementing Standard Operating Procedures, third-party inspections, and employee training programs.
- Met with local emergency management agencies in each operating area to review potential hazards and available information about material transport (e.g., commodity flow studies).
- Reviewed priority PSSC list for each system. Resulting updates are shown in Table 1. Note that PSSC names are considered confidential and can be provided separately upon request.

Source Water Monitoring

- Continued online source water panel monitoring, daily treatment process monitoring, and monthly bromide sampling to evaluate water quality conditions.
- Developed and piloted automated event detection system to identify anomalies from baseline conditions observed for online source water quality indicator parameters.
- Maintained centralized capability to perform advanced organics analyses at Kanawha Valley (GC/MS, GC/FID) and Huntington (GC/MS); and algae monitoring at Huntington.
- Installed Inficon CMS5000 for online monitoring of organics at Kanawha Valley Treatment Plant and joined the ORSANCO Organics Detection System network.
- Conducted siting study, preliminary design, and endangered species habitat survey for potential upstream monitoring stations for Kanawha Valley Treatment Plant on the Elk River.
- Participated as active members of watershed monitoring networks including the ORSANCO Organics Detection System and River Alert Information Network (RAIN).

Contingency Planning

- Revised and updated Facility Emergency Response Plan contact information for each system.
- Distributed SWPP Contingency and Communication Plans and provided training for employees.
- Facilitated tabletop exercise for Kanawha Valley System on October 5, 2017. External partners included representatives from state and county health departments, Public Service Commission staff and consumer advocate, emergency management agencies, and environmental agencies.
- Participated in full-scale emergency preparedness exercise for Huntington area hosted by Cabell-Wayne Local Emergency Planning Committee on September 23, 2017.
- Hosted regional seminars with discussion-based emergency preparedness exercise for our Northern Operating Area (Gassaway, Webster Springs, Weston) on December 6, 2017 and Southern Operating Area (Bluefield, Bluestone, New River) on December 7, 2017. External partners included representatives from state and county health departments, emergency management agencies, US Army Corps of Engineers, and local public service districts.
- Coordinated and participated in various meetings with representatives from Local Emergency Planning Committees throughout the year on emergency preparedness and coordination efforts.

SWPP Implementation Effectiveness – Case Study Example
Cargo Plane Crash at Yeager Airport in Charleston, WV

On May 5, 2017, a cargo plane crashed in a wooded area at Yeager Airport in Charleston, West Virginia, which is located approximately two miles upstream of the intake for the Kanawha Valley Water Treatment Plant. West Virginia American Water worked closely with emergency responders, airport personnel, and health officials to identify potential routes where spilled fuel from the plane could possible enter the Elk River. Utility staff collected samples for analysis of fuel components and were able to confirm that the fuel did not impact water quality at the intake.

Source water protection planning and implementation efforts contributed to the effectiveness of the response. The airport had already been identified as a potential source of contamination, so WVAW was able to quickly access information related to jet fuel and the requirements for sampling, analysis, and treatment. The team was also familiar with airport and local emergency management contacts and procedures, which helped with the coordinated response. There were no impacts to the water supply due to this event.

Outreach and Education

- Provided information about source water protection through Consumer Confidence Reports, WVAW website, and bill inserts. Customers are encouraged to provide feedback on the program anytime at https://amwater.com/wvaw/water-quality/source-water-protection/source-water-protection-plans/source-water-protection-feedback-form.
- Created new page on website about how to contact us with information for aboveground storage tank notifications: https://amwater.com/wvaw/water-quality-source-water-protection-above-ground-storage-tank-notifications.
- Communicated directly with upstream PSSCs (see Source Monitoring, above, and attached flyer)
- Hosted numerous plant tours and community events with a watershed component, such as Make It Shine Earth Day (4/20), Water Day at the Clay (11/20).
- Provided annual support for watershed activities through Environmental Grant Program.
- Visited schools and hosted Protect Our Watersheds art contest to educate children about the importance of protecting sources of supply for drinking water.
- Presented results of the Kanawha River Study nationally at the American Water Works Association (AWWA) Annual Conference and Exposition in June.
- Participated in collaborative industry groups to share ideas and practices (e.g., AWWA Source Water Protection Committee and Technical Advisory Work Group, United States Environmental Protection Agency Online Water Quality Monitoring Forum, ORSANCO, RAIN).
- Submitted and received request for WVDHHR grant to coordinate a regional community-based household hazardous waste collection event in 2018.

Input on Policies and Regulations

- Supported Public Water System Supply Study Commission and contributed recommendations.
- Participated in policy conversations with legislators during 2017 General Legislative Session related to bills with potential to impact water quality for drinking water sources.
- Provided input on ORSANCO's role in establishing and enforcing Pollution Control Standards.
- Reviewed West Virginia Department of Environmental Protection regulatory enforcement actions and communicated concerns regarding potential water quality issues.
- Served as Technical Advisory Group member for AWWA Government Affairs committee that provides national policy recommendations on drinking water issues.

IMPLEMENTATION CHALLENGES

The SWPPs identified certain challenges and/or limitations that could affect implementation. We have encountered several of these over the past year as detailed below.

Aboveground Storage Tank (AST) Notifications

West Virginia Code §22-30-10 requires AST owners and operators to provide information about tank location and contents directly to water utilities. The West Virginia Department of Environmental Protection has posted information about this requirement: https://dep.wv.gov/WWE/ee/abovegroundstoragetanks/Documents/NotificationtoWaterUtilityRequirementsGuidance.pdf. WVAW has also provided information on how to contact us with these notifications both on our website and through direct outreach to upstream facilities.

However, the estimated notification rate is only around 50% for AST owners and operators located within our upstream zones of critical concern and peripheral concern (ZCC and ZPC, respectively). Table 2 provides a summary of AST notifications by system. We encourage state health and environmental agencies to work together to enforce provisions of §22-30-10 requiring direct notification to water utilities. WVAW is willing to provide information upon request as appropriate to support these efforts.

Access to Updated PSSC Information

WVAW maintains access to the West Virginia Source Water Protection Program Map Viewer to access public and confidential data through the WVDHHR Office of Environmental Health Services portals. This tool has the capability to view and download PSSC data. The user guide indicates the date that each layer was last updated; however, there does not appear to be a way to query this information for features within the layers. It is therefore difficult to track any changes that occur over time. There is also limited information accessible in the data viewer and attribute table compared to what is available in the full record. We request that WVDHHR consider adding these fields and incorporating a method for users to query recent updates to each of the data layers.

PSSC Communications

Water utilities do not have any regulatory authority to require PSSCs to communicate directly with us. There is no requirement for them to do so, aside from the AST notifications required by W.Va. Code §22-30-10. We have had some success in establishing open lines of communication with priority PSSCs, as shown in Table 1. However, some have not responded even after several contact attempts. We intend to continue outreach efforts while recognizing that some facility owners and operators may elect not to communicate with us on a voluntary basis.

WVAW has also reached out to the West Virginia Department of Highways regarding road signage related to watershed protection and received a response that this type of signage would not be permitted (Attachment B).

CLOSING

Please feel free to contact us if you have any questions or would like to discuss. We appreciate any feedback you may have on our SWPP implementation progress to date.
Sincerely,

Erica Pauken
Erica Pauken
Source Water Protection Lead

JHeymann
Jennifer Heymann
Source Water Protection Manager

Table 1: Potential Source of Significant Contamination (PSSC) Communications Summary

PSSC Information – Water System		Bluefield	Bluestone	Gassaway	Huntington	Kanawha Valley	New River	Webster Springs	Weston
PSSC Priorities									
Priority	Priority A	1	1	2	5	4	5	1	4
	Priority B	1	3	3	7	7	4	3	6
	Priority C	0	7	4	7	14	2	2	9
	Priority D	0	4	0	16	16	0	0	3
	Priority E or other	0	0	0	20	6	0	0	0
PSSC Facility Type									
Facility Type	Industrial/Comm.	0	8	5	31	21	2	4	0
	Mining	0	0	0	0	1	2	0	1
	Municipal	1	0	3	5	6	2	2	2
	Oil & Gas	0	1	0	13	18	5	0	18
	Other/Recreation	1	6	1	1	1	0	0	1
	Power	0	0	0	5	0	0	0	0

Total Number of PSSC Facilities	**2**	**15**	**9**	**55**	**47**	**11**	**6**	**22**
WVAW initiated contact to PSSCs (#)	1	15	9	51	46	11	5	22
WVAW initiated contact to PSSCs (%)*	50%	100%	100%	93%	98%	100%	83%	100%

**Certain PSSCs not contacted because no contact information was available or applicable for site.*

Two-Way Communication WVAW & PSSCs (%)								
Priority A	100%	100%	50%	100%	100%	60%	100%	100%
Priority B	0%	33%	67%	57%	57%	50%	67%	50%
Priority C	---	14%	50%	43%	36%	0%	0%	22%
Priority D	---	25%	---	44%	25%	---	---	67%
Priority E or Other	---	---	---	45%	50%	---	---	---

PSSC Priority List Changes – 2017 Review								
PSSCs added to priority list (#)	0	0	1	3	2	0	0	0
PSSCs modified name on list (#)	0	0	0	6	5	0	0	1
PSSCs removed from list (#)	0	0	0	2	2	0	1	0

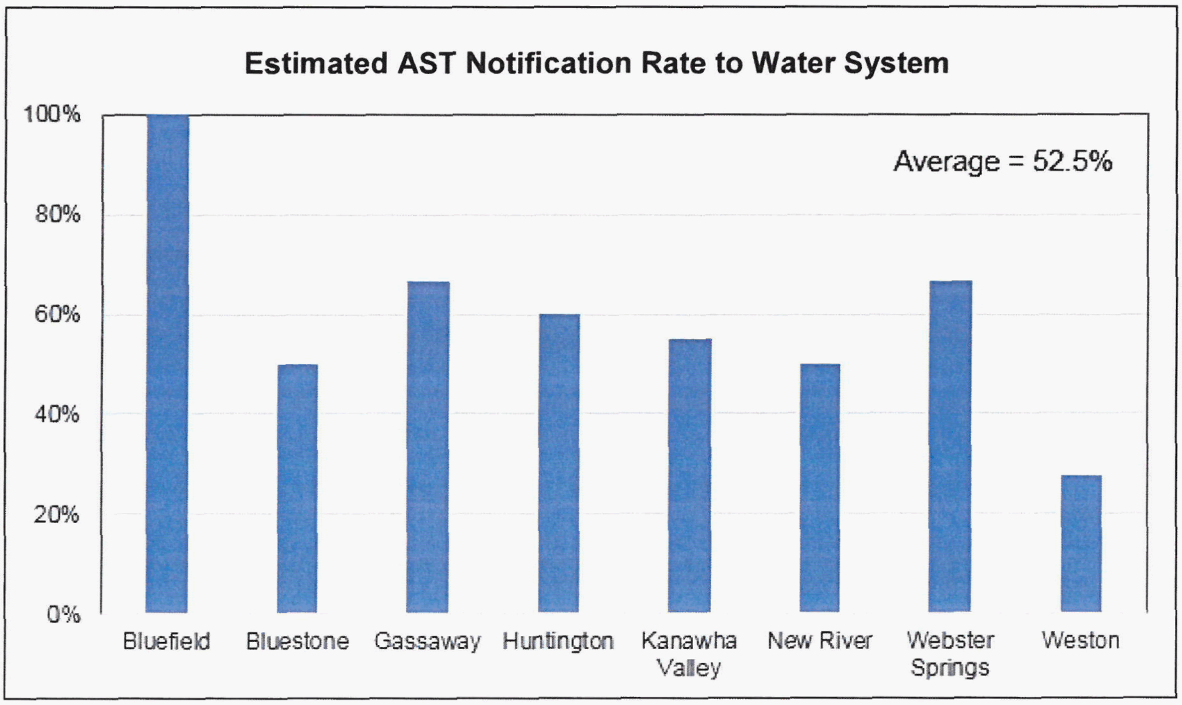
Note: Table represents communications with stationary (fixed) PSSC facilities as of date of this report. Specific details about individual PSSCs are not provided here for confidentiality and security reasons. These can be provided to WVDHHR upon request.

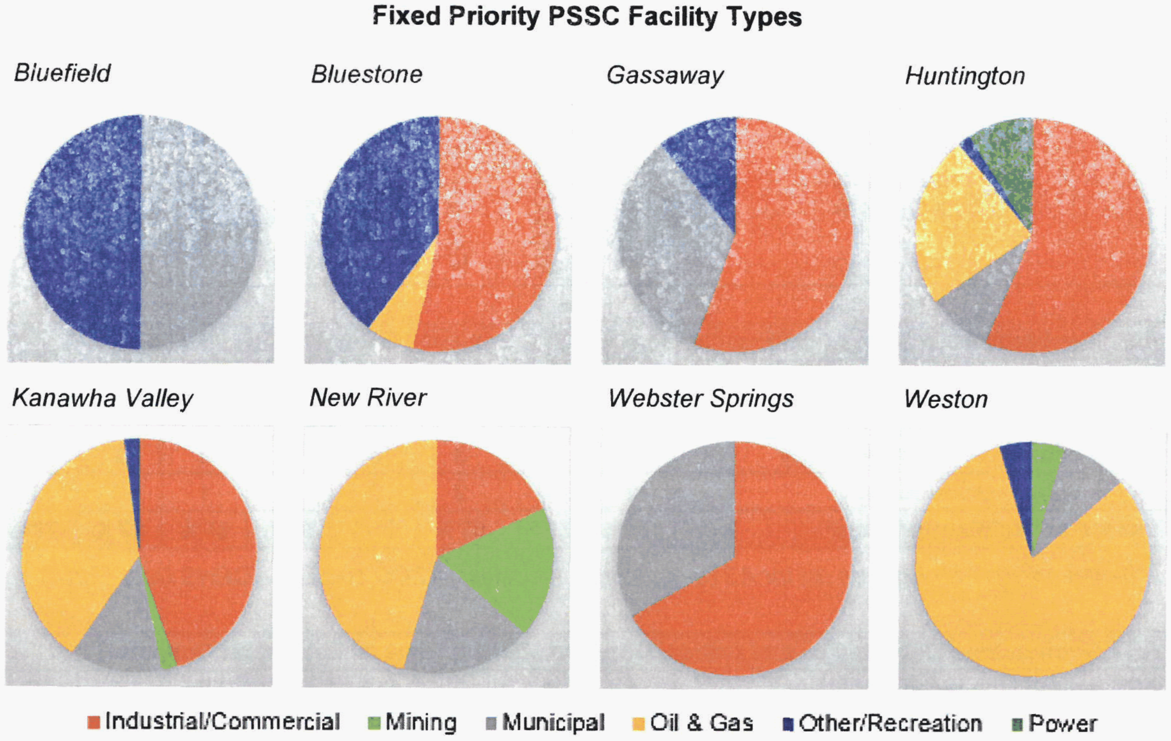
Table 2: Aboveground Storage Tank (AST) Notification Summary

AST Information – Water System	Bluefield	Bluestone	Gassaway	Huntington	Kanawha Valley	New River	Webster Springs	Weston
AST Notifications in Zone of Critical Concern (ZCC) & Zone of Peripheral Concern (ZPC)								
Total number of owners/operators listed	1	8	9	25	29	8	3	18
AST notifications received	1	4	6	15	16	4	2	5
Safety data sheet – provided copy	0	2	3	4	6	4	2	0
Tier II report – provided copy	0	0	2	2	1	1	0	1
Estimated Notification Rate*	**100%**	**50%**	**67%**	**60%**	**55%**	**50%**	**67%**	**28%**

**Based on 2017 registration list for ASTs registered in combined ZCC and ZPC (OEHS Data Portal)*

AST Information – Water System	Bluefield	Bluestone	Gassaway	Huntington	Kanawha Valley	New River	Webster Springs	Weston
AST Notifications Outside Zone of Critical Concern (ZCC) & Zone of Peripheral Concern (ZPC)								
AST notifications received	1	1	0	48	3	7	0	0
Safety data sheet – provided copy	0	0	0	14	2	4	0	0
Tier II report – provided copy	0	1	0	13	2	1	0	0




Fixed Priority PSSC Facility Types
Bluefield
Bluestone
Gassaway
Huntington
Kanawha Valley
New River
Webster Springs
Weston
Industrial/Commercial
Mining
Municipal
Oil & Gas
Other/Recreation
Power

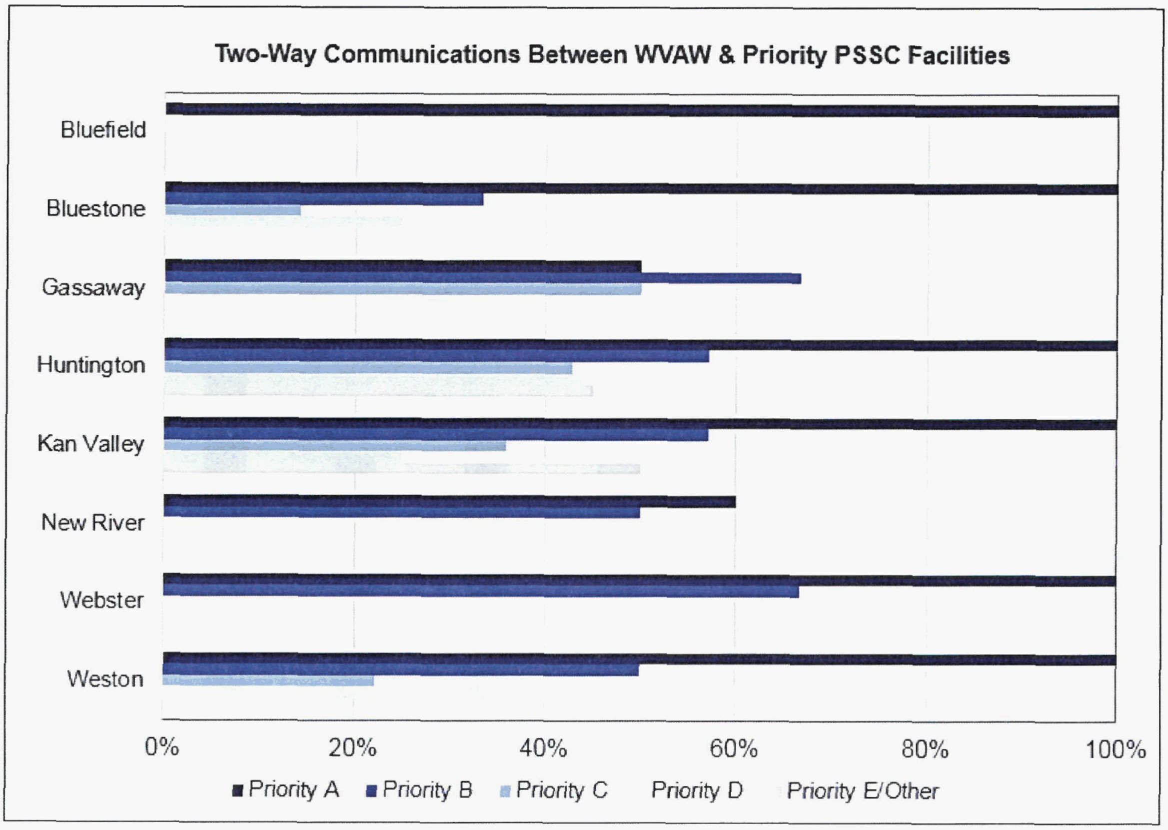

Two-Way Communications Between WVAW & Priority PSSC Facilities
Bluefield
Bluestone
Gassaway
Huntington
Kan Valley
New River
Webster
Weston
0%
20%
40%
60%
80%
100%
Priority A
Priority B
Priority C
Priority D
Priority E/Other

Table 2: Aboveground Storage Tank (AST) Notification Summary

AST Information – Water System	Bluefield	Bluestone	Gassaway	Huntington	Kanawha Valley	New River	Webster Springs	Weston
AST Notifications in Zone of Critical Concern (ZCC) & Zone of Peripheral Concern (ZPC)								
Total number of owners/operators listed	1	8	9	25	29	8	3	18
AST notifications received	1	4	6	15	16	4	2	5
Safety data sheet – provided copy	0	2	3	4	6	4	2	0
Tier II report – provided copy	0	0	2	2	1	1	0	1
Estimated Notification Rate*	**100%**	**50%**	**67%**	**60%**	**55%**	**50%**	**67%**	**28%**

**Based on 2017 registration list for ASTs registered in combined ZCC and ZPC (OEHS Data Portal)*

AST Notifications Outside Zone of Critical Concern (ZCC) & Zone of Peripheral Concern (ZPC)								
AST notifications received	1	1	0	48	3	7	0	0
Safety data sheet – provided copy	0	0	0	14	2	4	0	0
Tier II report – provided copy	0	1	0	13	2	1	0	0

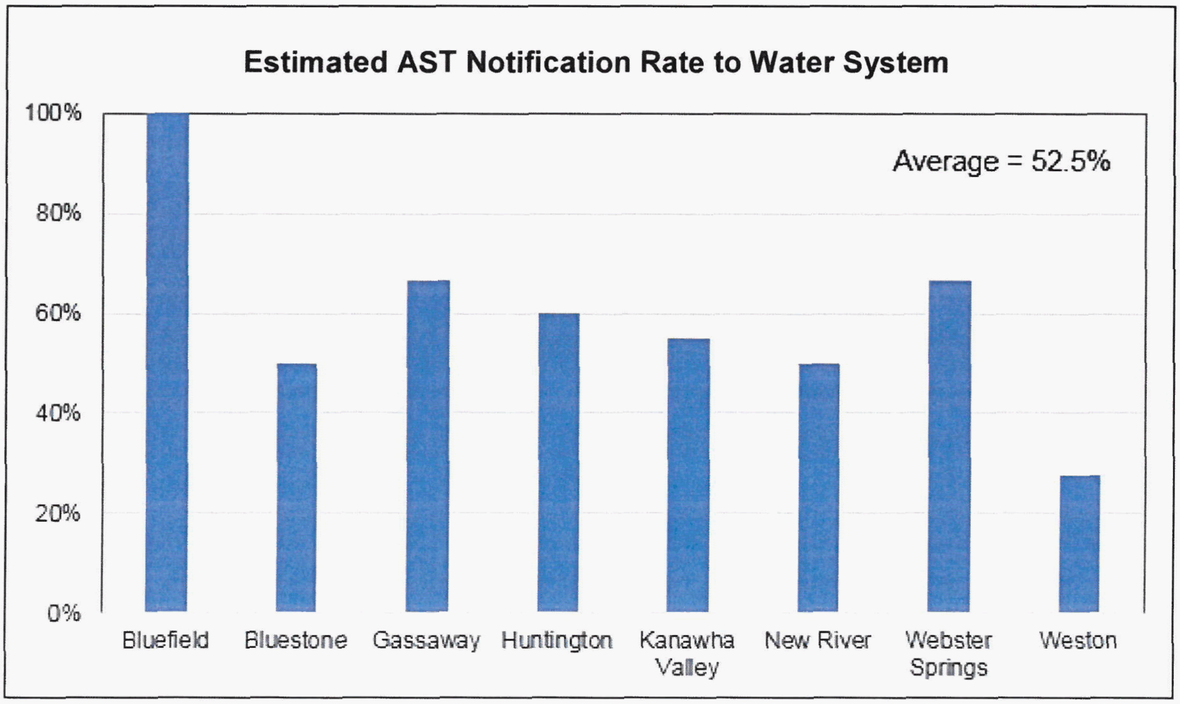


Exhibit 2

SWPP Implementation Summary for Kanawha Valley System, June 2019

Source Water Protection Plan Implementation Summary for Kanawha Valley System, June 2019

ID	Short Description	Schedule	Status	Status Notes
1-1A	Communicate with PSSCs	Phased	On Track	Ongoing communications and engagement with PSSCs (Exhibit 3)
1-1B	Compile chemical info & gaps	Phased	On Track	Developed chemical reference sheets and distributed to operations staff with training
1-1C	Communicate gaps to regulators	As Needed	On Track	Communicated challenges to BPH in 2019 plan updates: AST notifications, access to updated PSSC information, PSSC communication and AST database access. Discussions are ongoing regarding future access
1-2	Internal chemical management	Ongoing	On Track	Standard operating procedures in place, compliant with DEP Rules
1-3	Review transported materials	Annual	On Track	Received and reviewed commodity flow study from KPEPC
1-4	Review & update priority list	Annual	On Track	Updated: 5 removed, 9 modified names or responsible parties, and 2 additions
2-1	Continue process monitoring	Daily	On Track	Continued as ongoing part of operations
2-2	Source water indicators	Daily	On Track	Online panels operational and maintained, event detection underway
2-3	Bromide sampling & trending	Monthly	On Track	Samples submitted for analysis on a monthly basis
2-4	Centralized algae analysis	Ongoing	On Track	Shared resource capability located in Huntington; screening method added at KVS
2-5	Centralized organics analysis	Ongoing	On Track	Advanced capability located at Kanawha Valley Treatment Plant
2-6	Watershed monitoring networks	Ongoing	On Track	Member of ORSANCO ODS with new Inficon CMS equipment
3-1	Update ERP contact information	Annual	On Track	Annual review and update underway for KVTP
3-2	Review or exercise procedures	Annual	On Track	Conducted 2018 tabletop exercise; planning for 2019 full-scale underway
3-3	Maintain LEPC relationships	Ongoing	On Track	Regularly participate in KPEPC meetings, meet separately to share data
4-1	Include source water info in CCR	Annual	On Track	Section on source water protection program updated in 2018 CCRs
4-2	Customer education materials	Ongoing	On Track	Website updates, handouts at community events/presentations
4-3	Communicate good practices	Phased	On Track	Continue to communicate and provide signage to priority upstream facilities
4-4	Provide feedback mechanism	Ongoing	On Track	Hosted webinars and in-person meetings on plan updates. Customers can provide feedback by phone, mail, online form
4-5	Plant tours & open house events	Ongoing	On Track	Host open house events and provide plant tours on ongoing basis
4-6	Coordinate school curricula	Ongoing	On Track	School visits with watershed activities conducted throughout the year
4-7	Employee engagement	Ongoing	On Track	Employee participation in community activities, monitoring program, internal town halls, emergency response organizations and PSSC outreach communication
4-8	Source water collaborative	Ongoing	On Track	Ongoing partnership discussions with various utilities and agencies
4-9	Support watershed organizations	Ongoing	On Track	Environmental Grant Program and Protect Our Watersheds

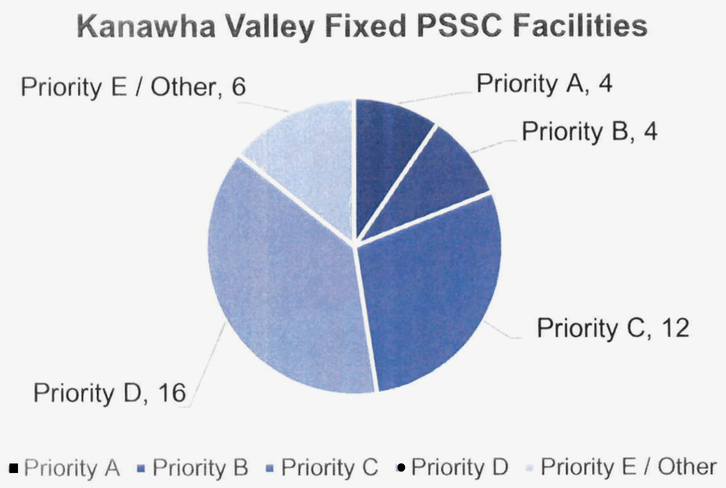
Source Water Protection Plan Implementation Summary for Kanawha Valley System, June 2019

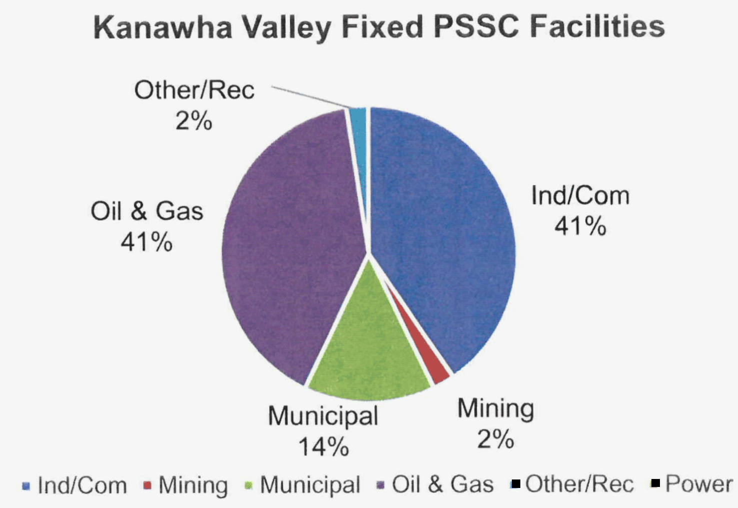
5-1	Review & input on regulations	Ongoing	On Track	Receive DEP public notices for permits, participate in AWWA advisory group
5-2	Support state & local policies	Ongoing	On Track	Involved in policy discussions during General Legislative Session
5-3	Provide input to PWSSSC	Ongoing	On Track	Participated in meetings, workshops, and recommendations for 2018 session

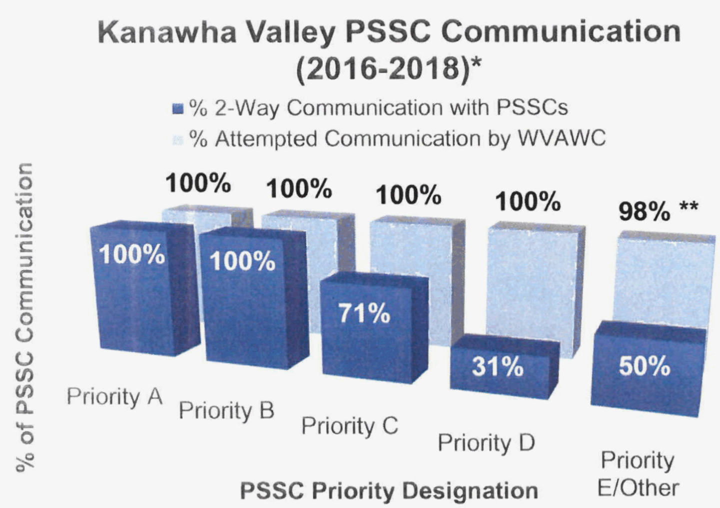
Exhibit 3

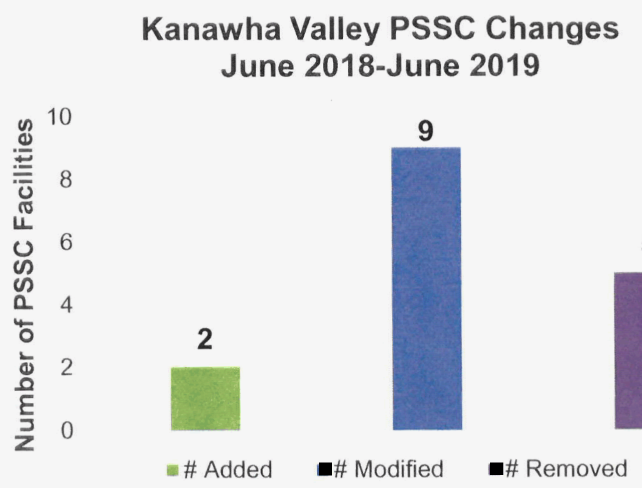
PSSC Inventory and Communications Summary, June 2019

Potential Source of Significant Contamination (PSSC) Inventory and Communications Summary, June 2019









Notes: Fixed PSSC facility totals do not include mobile threats. PSSCs have been identified as Priority A-E/Other based on proximity to the intake, size and type of facility or activity, and type of materials that may be present. Priority PSSCs warrant further investigation or action; they do not necessarily indicate a specific level of risk. (*) Section 1.0 of the Status Report goes into further detail about PSSC communication challenges. (**) PSSC contact information not available for one Priority E site.

Key: PSSC – Potential Source of Significant Contamination; Ind & Com – Industrial and Commercial; Other/Rec - Other/Recreation

Exhibit 4

Contaminant Information Available from Various Data Sources, June 2019

Contaminant Information Available from Various Data Sources, June 2019

Publicly Available?	Information Source	Gasoline, all grades	Diesel, all grades	Fuel Oil / Jet Fuel	Crude Oil	Brine Mixture, aka Sodium Chloride	Natural gas (petroleum), liq.	Methanol	Propylene Glycol	Calcium Chloride
Yes	CAMEO Chemicals[1]	•	•	•	•	•	•	•	•	•
	Properties	•	•	•	•	•	•	•	•	•
	Toxicity									
	Monitoring									
	Treatment									
Yes	ATSDR Profile[2]	•	•	•	•		•		•	
	Properties	•	•	•	•		•		•	
	Toxicity	•	•	•	•		•		•	
	Monitoring	•	•	•	•		•		•	
	Treatment									
No	WCIT Database[3]	•	•					•		
	Properties	•	•					•		
	Toxicity	•	•					•		
	Monitoring	•	•					•		
	Treatment	•	•							
No	WaterSuite Database[4]	•	•	•	•	•	•	•	•	•
	Properties	•	•	•	•	•	•	•	•	•
	Toxicity	•	•	•	•	•		•	•	•
	Monitoring									
	Treatment									
No	ORSANCO Reference[5]			•						
	Properties									
	Toxicity									
	Monitoring			•						
	Treatment			•						
x	PSSC(s) Provided SDS[6]	•	•		•		•			•

References

1 - CAMEO Chemicals Version 2.7, Rev 1, NOAA, https://cameochemicals.noaa.gov/
2 – Agency for Toxic Substances & Disease Registry, CDC, https://www.atsdr.cdc.gov/toxprofiles/index.asp
3 – Water Contaminant Information Tool, USEPA, https://www.epa.gov/waterdata/ (login access)
4 – WaterSuite Contaminant Database Module, https://www.watersuite.com (login access)
5 – Ohio River Valley Sanitation Commission (ORSANCO), Toxic Substances Data, 1988
6 – Safety Data Sheets (SDS) provided by PSSC facilities and maintained by WVAWC

Exhibit 5

Contamination Event Response and Contingency Plan, Updated April 29, 2019

I. OBJECTIVE

This plan has been developed to document the planned response to contamination of source water supplies in accordance with applicable state regulations. The overall objective is to mitigate the impacts of a source water contamination event on customers, services, property, the environment, and the Company (West Virginia American Water, or WVAW).

II. APPLICABILITY

The following plan provides guidance for investigating and responding to contamination events that have the potential to impact WVAW source water supplies. It consists of a phased approach that meets state regulatory requirements for public notification and is consistent with National Incident Management System (NIMS) and United States Environmental Protection Agency (USEPA) guidance.

The contingency plan is related to and should be referenced in conjunction with the communications plan, which documents how WVAW will, in cooperation with appropriate emergency response agencies, notify local health agencies and the public of a spill or contamination event. This includes provisions for initial notification to the public within thirty (30) minutes of WVAW becoming aware that the spill, release or potential contamination of the public water system poses a potential threat to public health and safety.

III. ROLES AND RESPONSIBILITIES

An internal incident command team will be established for each event to designate roles and responsibilities. Team roles may vary depending on the size and complexity of the event in accordance with NIMS Incident Command System (ICS) principles. WVAW will maintain personnel knowledgeable of and with expertise necessary to respond to an event consistent with this approach.

Attachment A provides example ICS organization charts for three different levels that correspond to the phases of a contamination event scenario:

- **Possible** threat under investigation
- **Credible** threat to public health and safety with some risk for escalation
- **Confirmed** threat with potentially significant impacts to public and/or system

These examples are intended to provide guidance for filling ICS roles but may vary based on the event situation. Multiple positions are listed for some ICS roles to allow for flexibility in assigning roles and providing backup relief as an event evolves. Only one individual will be established as the lead for each ICS role to maintain unity of command and accountability during an event. Table 1 provides a description of each ICS role as defined in NIMS.

Command roles may be expanded and/or transferred as an event becomes prolonged or changes in severity or complexity. They may also change to a unified command structure if multiple agencies are involved. The transfer of command process and/or shift to unified command with external agencies should include a briefing that captures the essential information for continuing operations.

Table 1. Description of ICS Roles (U.S. Department of Homeland Security, 2008)

Incident Commander	Overall responsibility for the managing the event by establishing objectives, planning strategies, and implementing tactics. Responsible for all ICS management functions until delegated to a function lead.
Public Information Officer	Serves as the conduit for information to internal and external stakeholders, including the media and the public.
Safety Officer	Monitors safety conditions and develops measures for ensuring the safety of personnel involved in the event response.
Liaison Officer	Serves as the primary contact for other agencies assisting at an incident. Collects information from subject matter experts.
Operations Section Chief	Responsible for developing and implementing strategy and tactics. Organizes, assigns, and supervises all response resources assigned to the event.
Planning Section Chief	Oversees the collection, evaluation, and dissemination of operational information related to the incident. Also prepares action plan and tracks resources.
Logistics Section Chief	Responsible for providing facilities, services, and material support for the event including communication equipment and sustenance for responders.
Finance / Admin Section Chief	Responsible for the financial and cost analysis aspects of an event including contracts, accident and injury documentation, and cost tracking.

IV. PROCESS DETAIL

The following sections describe the phases of a potential source water contamination event and typical considerations for investigating and responding to a threat in a timely manner. ***Note***: Specific actions will depend on the circumstances and the severity of an event, and will be determined based on conditions as they occur.

A. Threat Analysis

Contamination events typically begin as a ***contamination threat*** – "a suggestion or indication that water has been or will be contaminated, but no conclusive proof has been collected yet to confirm that contamination has actually occurred. A threat may be written, verbal, or based on observations or other evidence." (USEPA, 2006) The event may then progress to a ***contamination incident*** when the presence of a harmful contaminant has been confirmed.

WVAW could receive information about potential contaminant threats through various methods including, but not limited to:

- Direct contact from agencies, owners or operators, other water or wastewater utilities, customers, employees, and/or media sources;
- Monitoring data such as direct observations and water quality measurements from process monitoring and/or internal or external laboratory testing;
- Subscription alerts such as spill notifications and Corporate security information; and
- Other reports including news reports, social media, and/or third party reports.

In general, threats should be evaluated on a case-by-case basis with a sense of urgency to validate, assess the risk, and develop appropriate response actions. There are certain types of events that do not pose a concern and need not be further investigated following the initial notification. Examples include:

- Spills or releases that do not affect our sources of supply, e.g., air releases or ground impacts that do not enter a waterway and/or releases to waterways that are not hydraulically connected to our source watersheds;
- Standard discharges that can be addressed through our water treatment process, e.g., normal overflows and bypasses from municipal wastewater systems (CSO/SSOs) or NPDES discharges within permit limits; and
- Releases that do not have an impact on customer health or water system, e.g., food-grade products (excluding salt).

B. Contamination Event Phases

The following phases of a contamination event have been identified based on USEPA guidance and clarified in the context of West Virginia Bureau for Public Health (WVBPH) Legislative Rule §64-3-14.6.k regarding whether an event poses a potential risk to public health and safety.

Possible Contamination Phase: Notification and initial investigation of a contamination threat to determine if contamination could have occurred and whether it could potentially pose a risk to public health and safety.

Credible Contamination Phase: Multiple lines of evidence from the initial investigation indicate that contamination has occurred and poses a potential risk to public health and safety. It is important to note that a credible determination is based on whether there is a potential risk to the public, not whether the notification came from a reliable source.

Confirmed Contamination Phase: Information collected over the course of threat investigation provides definitive evidence that the source water has been contaminated and poses a potential risk to public health and safety.

C. Event Response Protocol

Event response begins once initial notification of a contamination threat is received (see IV.A) and progress to each subsequent phase following appropriate actions and decisions as outlined in Table 2 (see page 5).

Attachment B presents a flow chart of this process. Each phase includes communication, investigation and operational activities. See below for examples of various considerations that may be incorporated into the response. ***Note***: Specific actions will depend on the circumstances and the severity of an event, and will be determined based on conditions as they occur.

Threat Investigation

- Release information – location, conditions, agencies involved, regulatory information, etc.
- Contaminant property information – name, physical properties, toxicity, treatability, etc.
- Flow and transport – quantity, distance, flow conditions, time of release and travel, etc.
- Potential risk to public health and safety
- Verification of threat from other info sources
- Involvement of other parties who may have information and/or take action – railroad, highways, nearby facilities
- Reports from media sources

Sampling and analysis, including:

- Site access and safety
- Sampling personnel and support
- Sampling method – location, number, frequency, containers, transport, etc.
- Analysis method – handheld, benchtop, GC/MS, external laboratory
- Laboratory capabilities and contacts
- Potential industry or utility partners
- Baseline sampling results for comparison
- Quality assurance and quality control
- Confirmation of sampling results

Operational Considerations

- Current and predicted system conditions – system storage, demand, flow, etc.
- Current and predicted weather conditions
- Internal or external expertise
- Jar testing for treatability
- Treatment chemical adjustments
- Treatment process modifications
- Advisory type – e.g., boil, do not use, etc.
- Staff availability and scheduling
- Resource availability and scheduling – equipment, water transport, etc.
- Contractor arrangements
- System flushing options
- Contamination isolation or diversion
- Alternative supply options – power, intake, sources of supply, interconnections, etc.

Effective communication is important throughout the entire event response process. This includes internal communication across functional groups as well as external communication with agencies, media and the public. Attachment B includes an overview of communications for each phase. Additional details related to public notification and updates are included in the related communications plan (WVAW, 2019).

Table 2. Contamination Event Response Phases

INITIAL NOTIFICATION	
Trigger	Contamination threat notification received
Actions	• Notify Water Quality Manager and Source Water Protection State Lead of threat • Water Quality Manager and/or Source Water Protection State Lead escalate, if appropriate
Decision	Is threat realistic and does it have the potential to cause harm?
Roles	Initial responder, water quality, source water protection
POSSIBLE PHASE	
Trigger	Threat is realistic and has potential to cause harm
Actions	• Conduct initial investigation to evaluate threat and whether it poses a risk to public • Consider plans for operational response and communications
Decision	Does threat pose a risk to public health and safety?
Roles	Establish ICS structure appropriate for phase (see Attachment A examples)
CREDIBLE PHASE	
Trigger	Threat poses a risk to public health and safety
Actions	• Communicate with appropriate agencies and notify the public within 30 minutes of determination that a threat to public health and safety exists • Continue investigation to characterize and confirm threat • Consider operational response • Determine whether threat can be confirmed through sampling or other evidence • Communicate updates to appropriate agencies and the public
Decision	Has threat been confirmed through sampling or other evidence?
Roles	Establish ICS structure appropriate for phase (see Attachment A examples)
CONFIRMED PHASE	
Trigger	Threat has been confirmed
Actions	• Implement operational actions and support remedial actions to mitigate impacts • Consider resource needs and availability and seek support if appropriate • Determine whether threat continues to pose a risk to the public • Communicate updates to appropriate agencies and the public
Decision	Does threat continue to pose a risk to public health and safety?
Roles	Establish ICS structure appropriate for phase (see Attachment A examples)
EVENT CLOSURE	
Trigger	Threat does not pose a risk to public or system
Actions	• Threat has been reduced or eliminated; return system to normal operations • Continue to monitor situation and modify course if appropriate • Communicate updates to appropriate agencies and the public
Decision	Does threat continue to pose a risk to public health and safety?
Roles	Return to normal operational roles and responsibilities

An incident command team should be established for each event as outlined in the Roles and Responsibilities section of this document. The team will be responsible for developing an event-specific course of action that addresses the following considerations:

- Objectives
- Safety (e.g., site access, PPE)
- ICS roles and responsibilities
- Resource needs and assignments
- Information requirements
- Key decision points
- Communication timing and methods
- Investigation and sampling activities
- Operational responses
- Update schedule

Key decisions, actions and external communications should be documented during each event. The format and level of documentation may vary depending on the complexity of the event, but at a minimum shall include the basis and result of any decisions to escalate or close out the event.

V. TRAINING

The training and exercise process provides a framework for understanding and improving event response. This includes completion of general training courses to learn core concepts and hands-on activities to familiarize employees and response partners with the plan. WVAW employees in ICS organization functional roles should complete appropriate training and participate in plan based exercises.

<u>Applicable Training Courses</u>

- FEMA IS-700.b National Incident Management System (NIMS): An Introduction
- FEMA IS-100.c Introduction to Incident Command System
- FEMA IS-200.c Incident Command System for Single Resources & Initial Action Incidents

Exercises may be conducted to work through the response to a hypothetical contamination event using the procedures identified in this plan. These should consist of discussion-based exercises such as tabletops, seminars, and workshops followed by operations-based exercises ranging from drills to full-size examples as described by the Homeland Security Exercise and Evaluation Program (HSEEP). To the extent practicable, external response partners should be included in exercise activities to establish a working relationship and shared understanding of response roles and capabilities.

VI. PLAN MAINTENANCE & UPDATES

This plan is intended to be a living guidance document that evolves over time based on lessons learned through exercises and events. The Source Water Protection State Lead will be responsible for maintaining the plan and ensuring that it is reviewed and updated, if appropriate, on an annual basis and as any applicable requirements are updated.

VII. REFERENCES

U.S. Department of Homeland Security, 2008, National Incident Management System (NIMS), 170 pp.

USEPA, 2003, Planning for and Responding to Drinking Water Contamination Threats and Incidents: Overview and Application, EPA-817-D-03-007, 17pp.

USEPA, 2006, A Water Security Handbook: Planning for and Responding to Drinking Water Contamination Threats and Incidents, 72 pp.

USEPA, 2015, Consequence Management Primer, EPA-817-B-15-002E, 9pp.

USEPA, Water Security Initiative, http://water.epa.gov/infrastructure/watersecurity/lawsregs/initiative.cfm

WVAW, 2019, Source Water Protection Plan, Appendix B: Communications Plan

WVBPH, 2015, Legislative Rule Title 64 Series 3, Public Water Systems, 20 pp.

VIII. REVIEW RECORD

Date	Reviewer	Comments / Document Changes
4/19/2018	J. Heymann	Added Section VIII Review Record to document updates
4/19/2018	J. Heymann	Updated roles and responsibilities for Section VI and Attachment A: ICS Organization Chart
5/3/2018	E. Pauken	Removed FEMA IS-701.a NIMS Multiagency Coordination System (MACS) Course from Section V. Training
4/29/2019	E. Pauken	Updated Communication Plan date to 2019 in Section IV. C
4/29/2019	E. Pauken	Changed initial notification from Source Water Protection Manager to Source Water Protection State Lead in Table 2. Contamination Event Response Phases
4/29/2019	E. Pauken	Updated required training courses to current versions in Section V

ATTACHMENTS

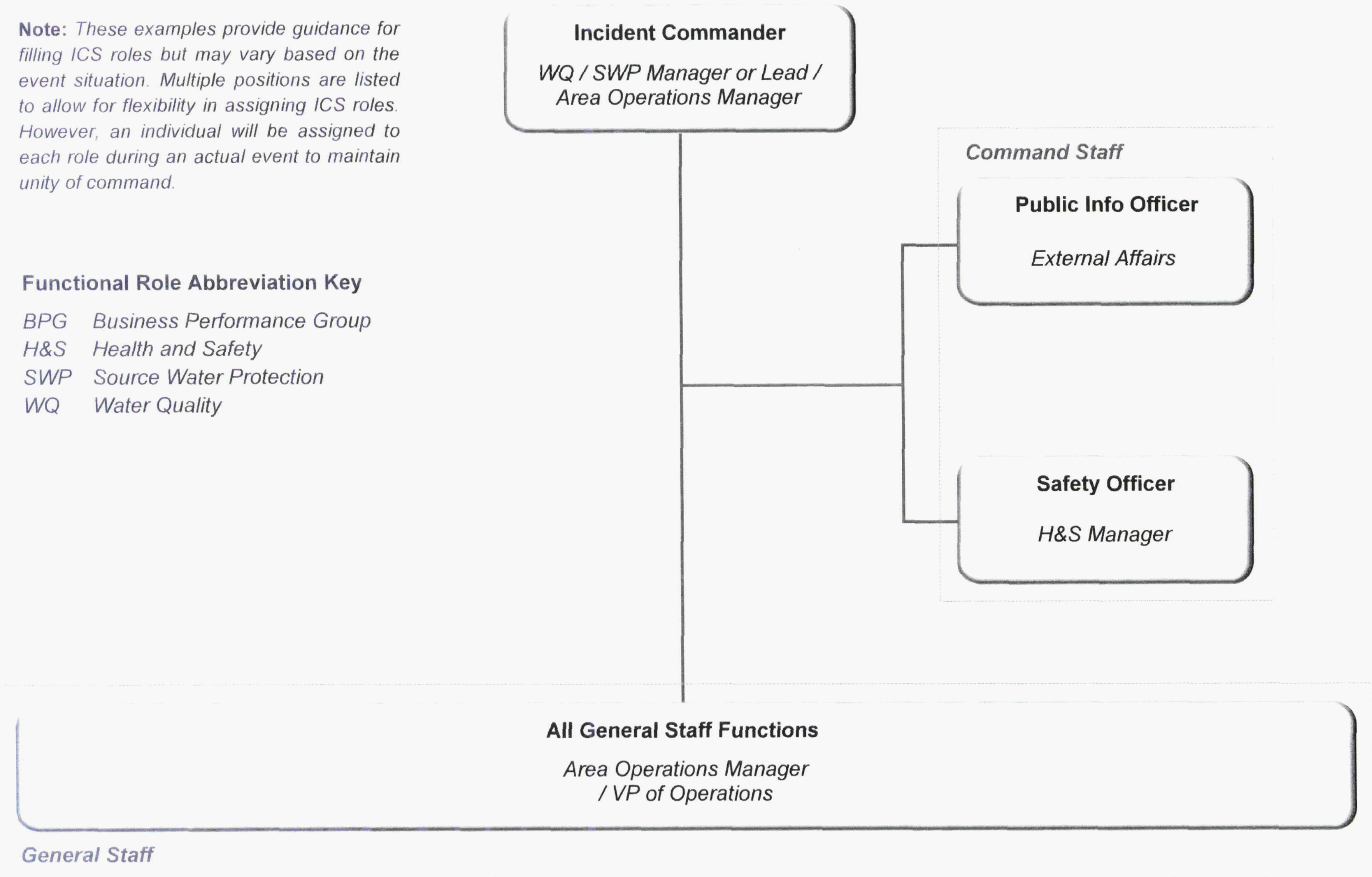
Attachment A: Example Incident Command System Organization Chart
Attachment B: Event Response Flow Chart

Incident Command System Organization Chart Example – Possible Phase

Note: *These examples provide guidance for filling ICS roles but may vary based on the event situation. Multiple positions are listed to allow for flexibility in assigning ICS roles. However, an individual will be assigned to each role during an actual event to maintain unity of command.*

Functional Role Abbreviation Key

BPG *Business Performance Group*
H&S *Health and Safety*
SWP *Source Water Protection*
WQ *Water Quality*

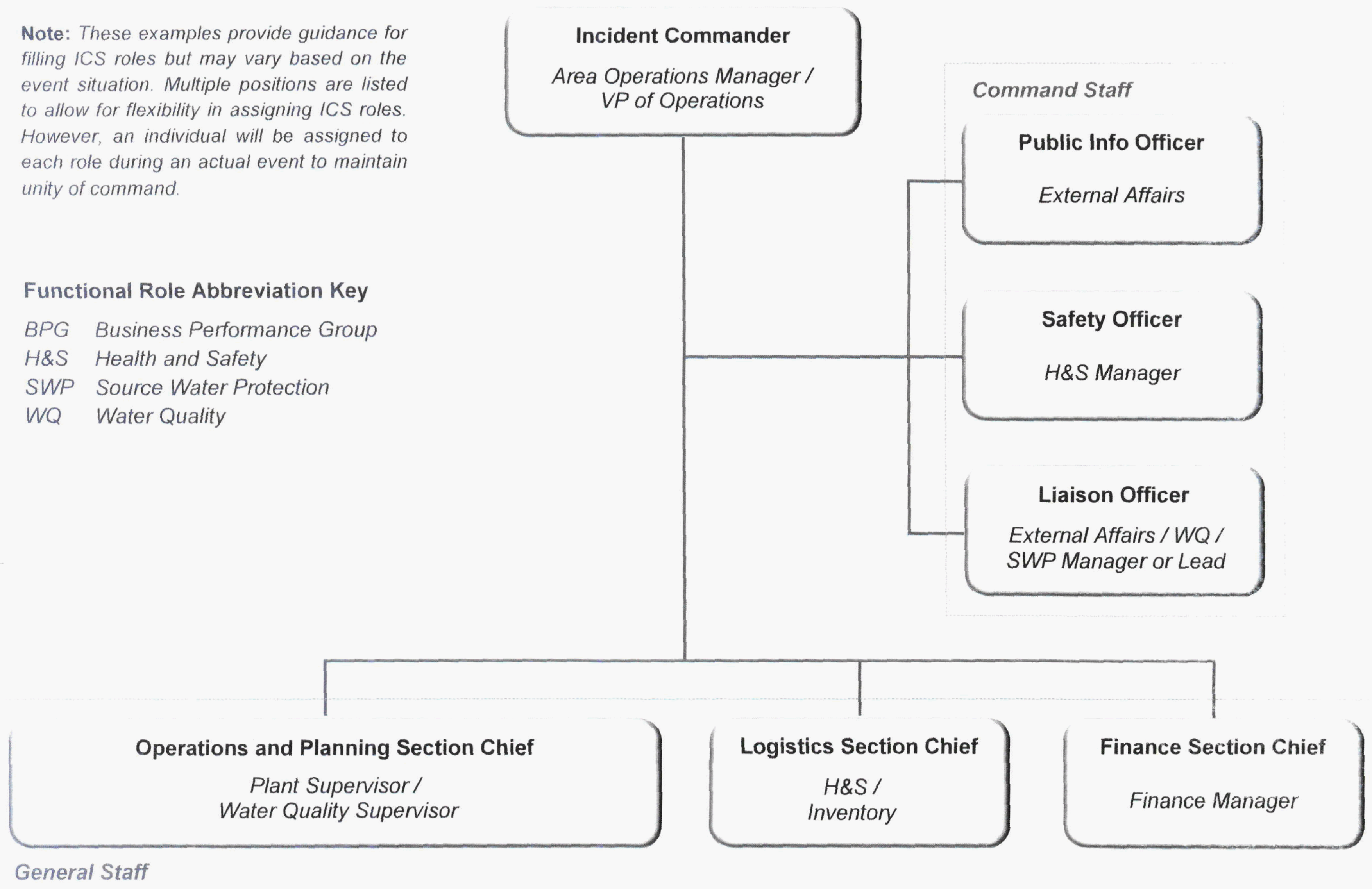


Incident Command System Organization Chart Example – Credible Phase

Note: *These examples provide guidance for filling ICS roles but may vary based on the event situation. Multiple positions are listed to allow for flexibility in assigning ICS roles. However, an individual will be assigned to each role during an actual event to maintain unity of command.*

Functional Role Abbreviation Key

BPG	*Business Performance Group*
H&S	*Health and Safety*
SWP	*Source Water Protection*
WQ	*Water Quality*

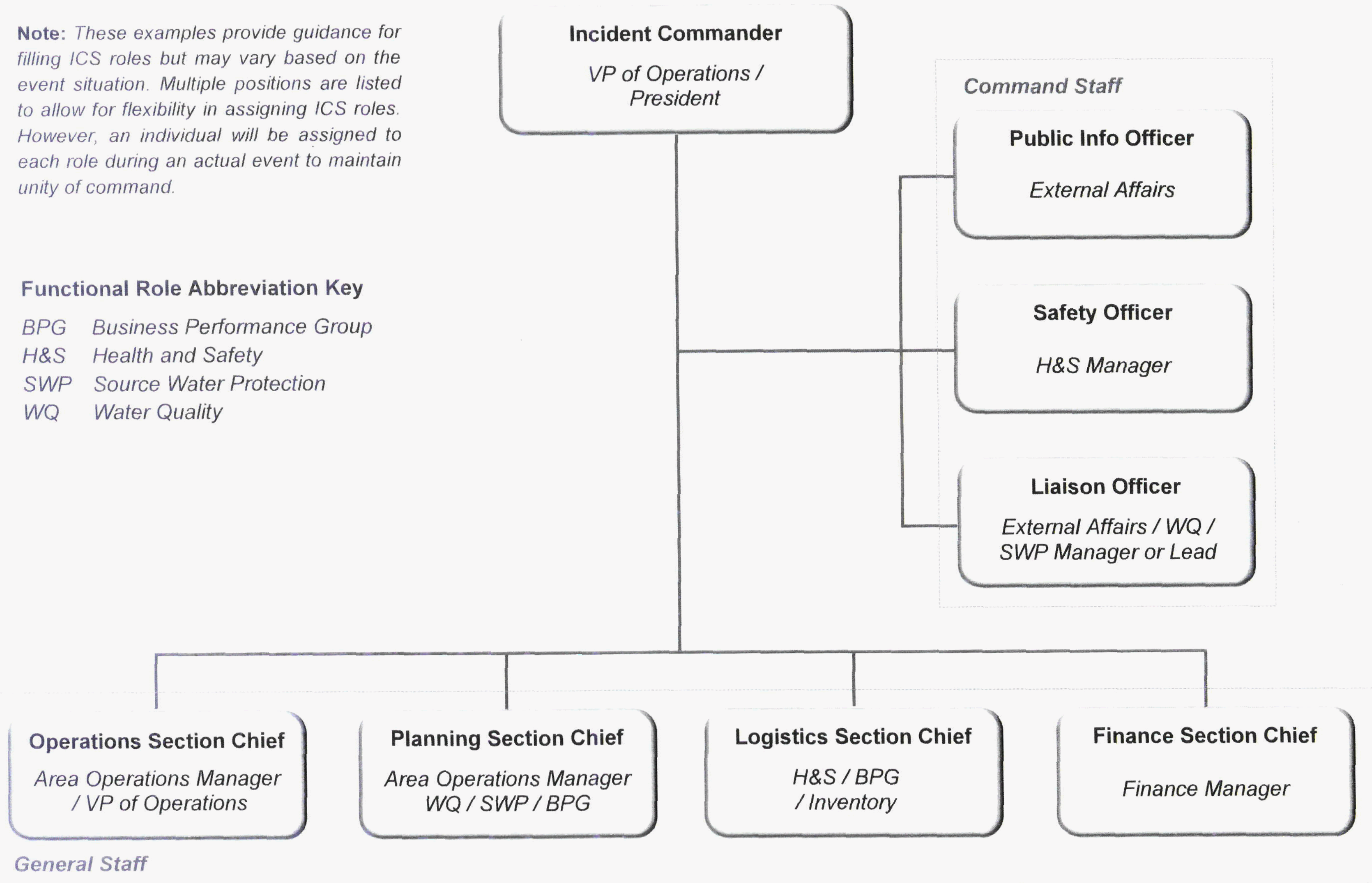


Incident Command System Organization Chart Example – Confirmed Phase

Note: *These examples provide guidance for filling ICS roles but may vary based on the event situation. Multiple positions are listed to allow for flexibility in assigning ICS roles. However, an individual will be assigned to each role during an actual event to maintain unity of command.*

Functional Role Abbreviation Key

BPG	*Business Performance Group*
H&S	*Health and Safety*
SWP	*Source Water Protection*
WQ	*Water Quality*



Contingency Plan Attachment B

EVENT RESPONSE FLOW CHART

WEST VIRGINIA
AMERICAN WATER

Note: This diagram provides guidance for responding to a potential contamination event. These types of events can change quickly in size and complexity, and specific actions taken may vary accordingly.

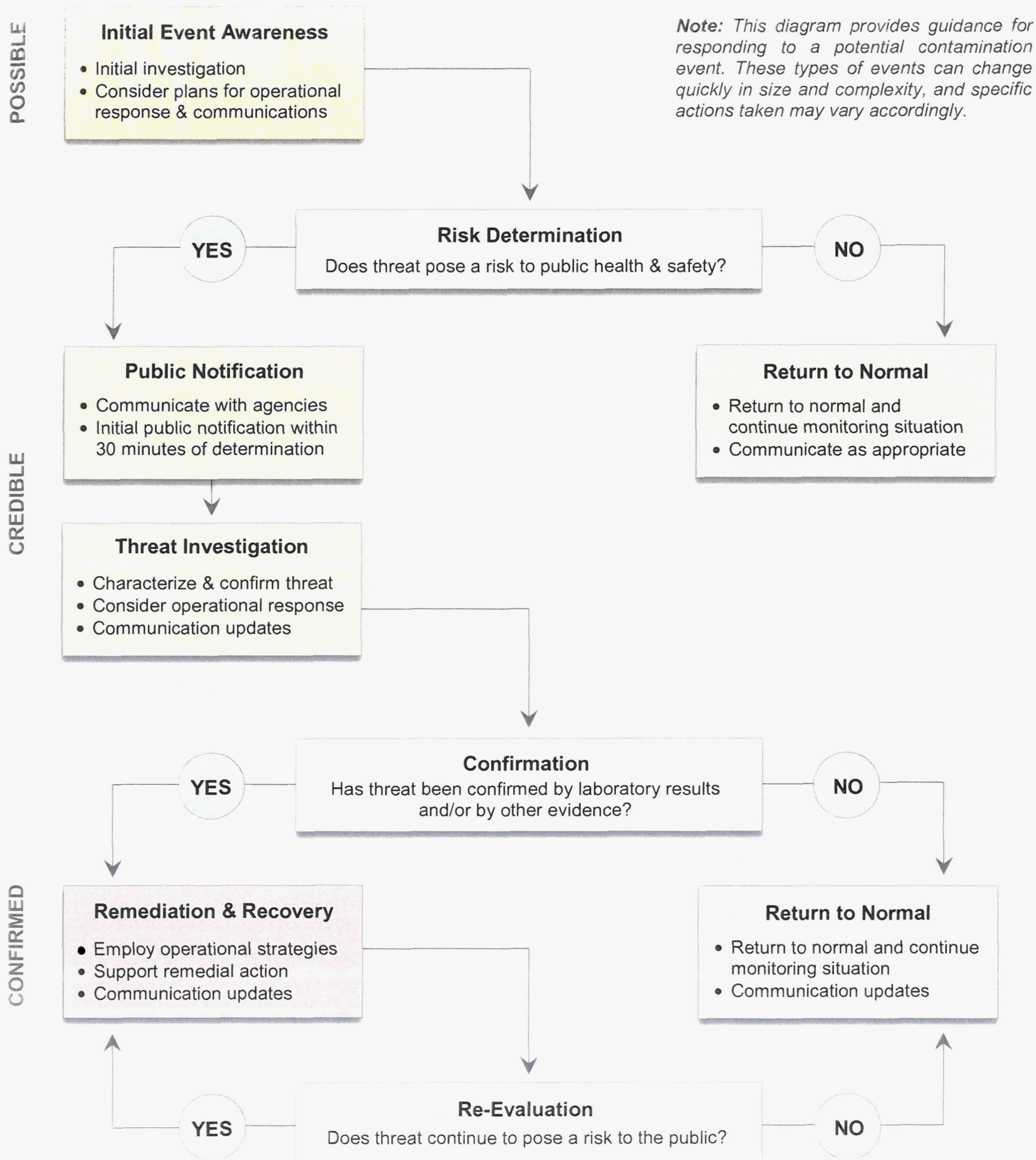


Exhibit 6

WVAWC Incident Command System
Roles and Training, June 2019

WVAWC Incident Command System Roles and Training, June 2019

WVAWC Personnel	Position Filled	NIMS Course Completion				Contingency Plan Reviewed
		IS-700	ICS-100	ICS-200	IS-701*	
Production Supervisor	Yes	x	x	x	x	x
Water Quality & Env. Compliance Supervisor	Yes	x	x	x	x	x
Health & Safety Manager	Yes	x	x	x	N/A*	x
External Affairs Manager	Yes	x	x	x	x	x
Water Quality & Env. Compliance Manager	Yes	x	x	x	x	x
Source Water Protection State Lead	Yes	x	x	x	N/A*	x
Finance Manager	Yes	x	x	x	x	x
Area Operations Manager	Yes	x	x	x	x	x
Director of Engineering	Yes	x	x	x	x	x
Director of Business Performance	Yes	x	x	x	x	x
Supply Chain Specialist II	Vacant	N/A	N/A	N/A	N/A*	N/A
VP of Operations	Yes	x	x	x	N/A*	x
President	Yes	x	x	x	N/A*	x
Source Water Protection Manager, Mid-Atlantic Division	Yes	x	x	x	x	x
SVP, Mid-Atlantic Division	Yes	x	x	x	x	x

Notes

NIMS – National Incident Management System, ICS – Incident Command System

(*) New team members unable to complete the FEMA IS-701.a NIMS Multiagency Coordination System (MACS) Course because it has been retired without replacement.

Exhibit 7

Kanawha Valley Source Water Protection, Preparedness, and Response Table Top Exercise After Action Report (AAR), October 2018

West Virginia American Water – Kanawha Valley
Source Water Protection, Preparedness, and Response
Table Top Exercise

Summary, After Action Report, and Improvement Plan

1. **Location**: West Virginia American Water, Charleston, WV

2. **Date**: October 3, 2018

3. **Event Description**: The Horsley Witten Group, Inc. (HW) facilitated a tabletop exercise (TTX) to assist drinking water utility staff, emergency responders, and state and local agencies to better prepare for a spill/source water contamination incident. The event featured a TTX focused on a hypothetical spill of an unknown contaminant along the Elk River in West Virginia.

   A list of attendees is provided in Attachment A. Invitees to the workshop included West Virginia American Water (WVAW) staff, U.S. Coast Guard, WV Div. of Homeland Security, WV Dept. of Environmental Protection, WV Public Service Commission, state and county health departments, county and city emergency management agencies, 911 centers, first responders and municipal representatives, healthcare personnel, public and private transportation representatives, ORSANCO, disaster relief agencies, and members of the local LEPCs. An event agenda and blank participant evaluation form are provided as part of the Situation Manual in Attachment B. WVAW's Contingency Plan steps and event response flow chart are also provided in Attachment B.

4. **Event Objectives:**
   - Identify roles and responsibilities of emergency response partners;
   - Review Contingency Plans, communication plans, policies and procedures;
   - Identify planning gaps; and
   - Encourage interagency cooperation

5. **Improvement Planning (IP) Matrix**: Following the TTX, an Improvement Planning (IP) matrix was developed for participants to use to further enhance their capability to coordinate and manage incidents that threaten the provision of safe drinking water along the Elk River in West Virginia. The IP matrix is included as Table 1.

Table 1: IP Matrix – the recommended actions/tasks/follow-up items resulting from the exercise are summarized in the table below. WVAW response partners can use the matrix as a road map to enhance the overall capabilities to prepare for and respond to natural and man-made incidents.

Action/Task/ Follow-up	People Who Should Be Involved	Resources and Possible Sources	Short Term Activity	Long Term Activity
Create a county/regional resource inventory	WVAW, ORSANCO	E team – WV State Inventory. ORSANCO-surveyed 33 water systems along the Ohio River	Develop/collaborate on an inventory to include laboratory equipment and other resources from WVAW, industry, and other partners	Update the resource list on a regular basis
Involve county health departments in future exercises	County health dept., WVAW		WVAW increase RSVP communication and build relationships	Consider exercise complexity to assess different scenarios and further refine roles of specific agencies and individuals
Ensure coordination between WVAW and Kanawha County during events to confirm joint messaging	WVAW and Kanawha County	LEPCs	Continue coordination with the county and build relationships	

Action/Task/ Follow-up	People Who Should Be Involved	Resources and Possible Sources	Short Term Activity	Long Term Activity
Ensure the National Response Center (NRC) is notified of potential spills is on a navigable water, in addition to the WVDEP Spill Line	Coast Guard, NRC, WVDEP, 911 centers			Educate all response partners on how to notify the NRC of potential contamination events
Conduct public outreach to homeowners about the implications to water quality from backflow events	WVAW	Existing WVAW outreach materials for businesses	Develop outreach material of homeowner tips and best practices	Create videos to share with the public

6. Table Top Exercise Summary:

Each participant received a Situation Manual, which is provided in Attachment B. A presentation with the TTX injects is provided in Attachment C. The following is a summary of lessons learned and/or best practices as discussed by participants during the TTX:

- It was helpful for TTX participants to understand the potential response steps made by the hospital or other medical facilities (e.g., urgent care clinics) during a potential source water contamination event.
    - If the hospital receives an influx of patients reporting the same symptoms and an unusual odor/taste in their water, the hospital starts to gather information from patients to identify their location and their water source to identify any trends. However, patients can visit different hospitals or medical facilities, so it is important for facilities to report these types of grouped illness complaints to county agencies.
- Two-way communication should occur between medical facilities and WVAW during an incident. WVAW distributes notifications to anyone on the distribution list if there is any messaging about a potential or confirmed incident. Health facilities can contact WVAW to be put on the distribution list for a particular service area. Health facilities that notice a trend in patient symptoms or patient complaints about the water should notify the county health department, EMS, and WVAW so that all agencies are operating with consistent information.
- The emergency public notification system, "CodeRED" is utilized by WVAW to notify customers of a drinking water incident. The CodeRED system is integrated with WVAW's geographic information system (GIS) and customer database, and allows WVAW to pinpoint potentially affected areas and send notifications based on customers' addresses. Customers in potentially affected areas will receive a phone call, alerting them of drinking water issues in their area. Customers can also receive email or text notifications, if they choose to opt-in to that form of communication.
- Activating the Emergency Operations Center (EOC) provides multiple benefits. EOC members work to disseminate consistent and joint public messages on behalf of all member EOC agencies involved in the incident. Activating and operating through the EOC also helps to ensure that all agencies receive the same information about the incident(s). The TTX showed that activating the EOC promotes effective communication throughout an incident. Participants noted that the EOC could be activated even if the incident is small-scale. The EOC can operate locally without making it a statewide effort.
- Maintaining good relationships with surrounding counties can be helpful. EOC representatives can notify downstream and upstream counties and/or facilities to see if they are aware of the incident and/or detected similar contaminants in their source water (if on the same river).
- The Coast Guard will be involved if there is a potential or confirmed spill on a navigable water. The Coast Guard would also need to be involved if the river had to be shutdown. The National Response Center (NRC) should be notified in addition to the WVDEP Spill Hotline if there is a potential or confirmed spill on a navigable water. During the TTX, participants noted that not all agencies know to report incidents to the NRC.
- During the TTX, it was discussed that many agencies may respond to a potential spill on the Elk River, including the Fire Department, County Emergency Services, WVDEP, DHHR, and WVAW. Redundancy is preferred as it ensures that all agencies are working together. If an EOC has been established, EOC representatives can help to coordinate activities between the agencies.

- Nuances in operations across agencies and within WVAW were revealed throughout discussions of internal processes and procedures. For example, TTX participants gained a better understanding of the time needed to collect and analyze samples and perform quality control measures using WVAW's gas chromatography–mass spectrometry (GC mass spec) laboratory equipment.
    - WVAW Kanawha Valley has laboratory equipment that can check the continuous monitoring equipment to verify the accuracy of sample results.
    - Not all compounds can be detected by the GS mass spec. There is additional equipment that is more comprehensive and can detect more compounds, however it does take more time to process samples.
    - ORSANCO can examine upstream measurements to determine whether samples are showing similar constituents and concentrations to downstream locations.
    - ORSANCO can work with industrial facilities to request help with sample analysis.
    - Identifying facilities' laboratory equipment and capacity is important in the event that samples need to be processed quickly and WVAW has no additional capacity. An inventory of nearby laboratory equipment and capacity would be helpful.
- There may be a slight disconnect between information WVDEP staff know as they are investigating a spill to what is provided in the WVDEP Spill Hotline spill report. Any new information based on the investigation should be provided.
- Managing WVAW's public messaging is critical to ensuring that the public is not confused. Public messages need to be clear, accurate and timely. It is difficult to "take back" information that has been publicly released, so it is important to release only information related to known facts. WVAW will deliver public messages as appropriate and/or when a threat has been determined to pose a risk to public health and safety. WVAW will respond in a timely manner to posts on social media (e.g., Facebook, Instagram) from the public, or information being reported through television or radio news. Regular updates to the media help ensure the public is provided accurate and concise information.
- Unified messaging from all response agencies is important. There may be a desire from other response agencies to send a public message before there is enough information for WVAW to report. Agencies need to coordinate through the incident command center or EOC to ensure no information is prematurely released.
- Contaminant identification is important before WVAW can issue any advisory such as Do Not Use, Do Not Drink, or a Boil Water Advisory. Depending on the contaminant, boiling water can be more harmful to customers.
- A third-party agency, such as the county or state health department (DHHR), could provide valuable services, such as analyzing samples at the end of the incident to confirm data consistency with the samples analyzed by WVAW, and ultimately confirm that the finished water complies with drinking water standards. Public trust of water systems after an incident is often compromised. Additional analysis from a third-party could provide the public with assurance that their drinking water is safe to use.
- Public outreach may help homeowners better understand the potential impacts of cross-connections and backflow events. WVAW does outreach to businesses on backflow prevention. Residential cross-connections are prohibited.
- The TTX helped participants realize that two isolated incidents could be happening at the same time; never assume that multiple incidents are linked to the same source of contamination. It is

important for WVAW and other response partners to investigate each incident fully before coming to any conclusions about response procedures.

- The TTX provided a great way for all agencies to meet face-to-face and establish contacts.

7. **Participant Evaluations**: At the conclusion of the TTX, participants were asked to fill out an evaluation form. Of the 31 TTX participants, 18 filled out the forms. Participants rated various aspects of the TTX using a scale of 1-5 (1=Strongly Disagree, 3=Agree, and 5=Strongly Agree). When asked if the tabletop exercise was a valuable use of participants' time, participants provided an average score of 4.6 out of 5 to indicate agreement with the statement. A summary of evaluation results can be found in Attachment D.

8. **Attachments**:
   - Attachment A: Attendee List
   - Attachment B: Participant Situation Manual
   - Attachment C: TTX Injects Presentation
   - Attachment D: Evaluation Summary

Attachment A - Attendee List Source Water Protection Tabletop Exercise, Charleston, WV October 3, 2018		
Name	**Organization**	**Email**
Dave Armstrong	Kanawha Co EMA	davidarmstrong@kanawha.us
Chris Carew	WVAW	chris.carew@amwater.com
Jeff Clark	Kanawha County EMA	jeffclark@kanawha.us
Chris Copley	WVAW	christopher.copley@amwater.com
Sam Dinkins	ORSACNO	sdinkins@orsanco.org
Paul Dryden	Metro 911	pdryden@metro911.org
Jim Ellars	WV-PSC	jellars@psc.state.wv.us
Dave Erwin	Kanawha Co EMA	daveerwin@kanawha.us
Jeff Ferrell	WVAW	Jeffrey.Ferrell@amwater.com
Grant Gunnoe	Charleston EMA	grant.gunnoe@cityofcharleston.org
Jennifer Heymann	WVAW	jennifer.heymann@amwater.com
Keith Hobbs	Thomas Health	keith.hobbs@thomashealth.org
David Hodges	CFD	
Jon Jarvis	WVAW	jon.jarvis@amwater.com
Rod Johnson	Kanawha Co EMA	rodjohnson@kanawha.us
Rusty Joins	WVDEP	Rusty.T.Joins@wv.gov
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Laura Martin	WVAW	laura.martin@amwater.com
Keith Morris	WVDHHR	Keith.V.Morris@wv.gov
Lillian Morris	CAMC	lillian.morris@camc.org
Mike Oakley	Kanawha Co EMA	mikeoakley@kanawha.us
Erica Pauken	WVAW	erica.pauken@amwater.com
CW Sigman	Kanawha Co EMA	CWSigman@kanawha.us
Susan Small	WV-PSC	ssmall@psc.state.wv.us
Scott Smith	Red Cross	scott.smith2@redcross.org
Sarah Snodgrass	WVAW	sarah.snodgrass@amwater.com
Rich Snyder	WVDHHR-BPH	Richard.C.Snyder@wv.gov
Mike Staley	WVAW	Michael.Staley@amwater.com
Billie Suder	WVAW	billie.suder@amwater.com
Andrea Thomas	WVAW	andrea.thomas@amwater.com

Kanawha Valley
Source Water Protection Tabletop Exercise

October 3, 2018

Participant Situation Manual

Sponsored by: West Virginia American Water
Facilitated by: The Horsley Witten Group, Inc.

Tabletop Exercise Schedule – October 3, 2018

12:00 p.m.	Check-in (Working Lunch)
12:30 p.m.	Welcome and Participant Introductions
12:45 p.m.	TTX Overview, Objectives, and Ground Rules • Purpose and Objectives • Roles of Participants
12:55 p.m.	Scenario Discussion
2:00 p.m.	Break
2:15 p.m.	Scenario Discussion
3:15 p.m.	Hotwash Session • Discuss participant lessons learned during the event • Improvement Planning
3:45 p.m.	Evaluations and Closing
4:00 p.m.	Adjourn

Exercise Overview

The goal of this tabletop exercise (TTX) is to bring together key personnel to discuss a hypothetical incident affecting the Kanawha Valley water supply. Participants can use this exercise to assess plans, policies, and procedures or evaluate the systems needed to guide the prevention of, response to, and recovery from a natural or man-made incident. This TTX gives participants an opportunity to discuss their roles and responsibilities as response partners. While this TTX is utilizing a specific scenario, plans, policies and procedures should be assessed from an all-hazard perspective.

Exercise Structure

This will be a multimedia, facilitated TTX. The exercise begins with a scenario narrative presented to the audience by an exercise facilitator. The scenario, which is built through injects (e.g., pieces of information), provides the backdrop that drives participant discussion. Following the scenario narrative, a facilitator will guide participants through a discussion period allowing participants to describe their actions, decisions, and notifications, as necessitated by the situation or change in resource status. Participants are encouraged to ask questions of other participants. Immediately following the discussion period, participants will engage in a facilitated hotwash session to discuss key issues raised during the event.

Exercise Objectives

The primary objectives of this TTX include:

- Identify roles and responsibilities of emergency response partners
- Review Contingency Plans, communication plans, policies and procedures
- Identify planning gaps
- Encourage interagency cooperation

Participant Roles and Responsibilities

Participants actively engage in response to the situation presented based on knowledge of response procedures, insights derived from training, and current planning concepts and procedures in place in their community, agency, or department.

Facilitator(s) provide situation updates via exercise injects and moderate discussions. They also provide additional information or resolve questions as required.

Recorders document participant discussions.

Exercise Assumptions and Artificialities

In any TTX, a number of assumptions and artificialities may be necessary to complete the exercise in the time allotted. Participation in the discussion is in accordance with the assumptions and guidelines below:

- The scenario is plausible, and events occur as presented;
- There are no "hidden agendas" or trick questions; and
- All participants receive information at the same time.

Exercise Rules of Conduct

A successful TTX also depends on the rules listed below, which have been proven to ensure effective discussion.

- There is no single solution and varying viewpoints, even disagreements, are expected.
- Dialogue is encouraged within a safe, open, and stress-free environment.
- Respond based on your knowledge.
- Your organization's positions or policies do not limit you.
- Make your best decision based on the circumstances presented.
- The basis for discussion consists of scenario narratives, your experience, understanding, and intuition.
- All information required to drive discussion during the TTX is contained in the exercise material or injects.
- Don't "fight" the scenario.

Scenario Overview

The hypothetical scenario takes place on the Elk River in West Virginia. The river is the raw water supply for West Virginia American Water's Kanawha Valley Water Treatment Plant. The timing of the scenario is early fall. River levels are average for this time of year throughout the state and along the Elk River.

West Virginia American Water, Kanawha Valley Tabletop Exercise
Participant Evaluation Form
October 3, 2018 · Charleston, WV

Name (optional) ____________________ **Organization** (optional) ________________

Position/Title (optional) _____________________

1. **The tabletop exercise was well structured and organized.**

Strongly Disagree		Agree		Strongly Agree
1	2	3	4	5

2. **The exercise provided an opportunity to enhance the interaction/coordination between West Virginia American Water (WVAW) and partners during an incident affecting the water supply.**

Strongly Disagree		Agree		Strongly Agree
1	2	3	4	5

3. **The exercise provided an opportunity to review steps in WVAW's Contingency Plan and information about effectively responding to an incident affecting the water supply.**

Strongly Disagree		Agree		Strongly Agree
1	2	3	4	5

4. **Overall, the tabletop exercise was a valuable use of my time.**

Strongly Disagree		Agree		Strongly Agree
1	2	3	4	5

Describe your overall impression (strengths/weaknesses) of the exercise.

____
____
____
____

What materials did you find most useful?

____
____
____
____

Provide recommendations for improving future exercises.

____
____
____
____

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Table 2. Contamination Event Response Phases

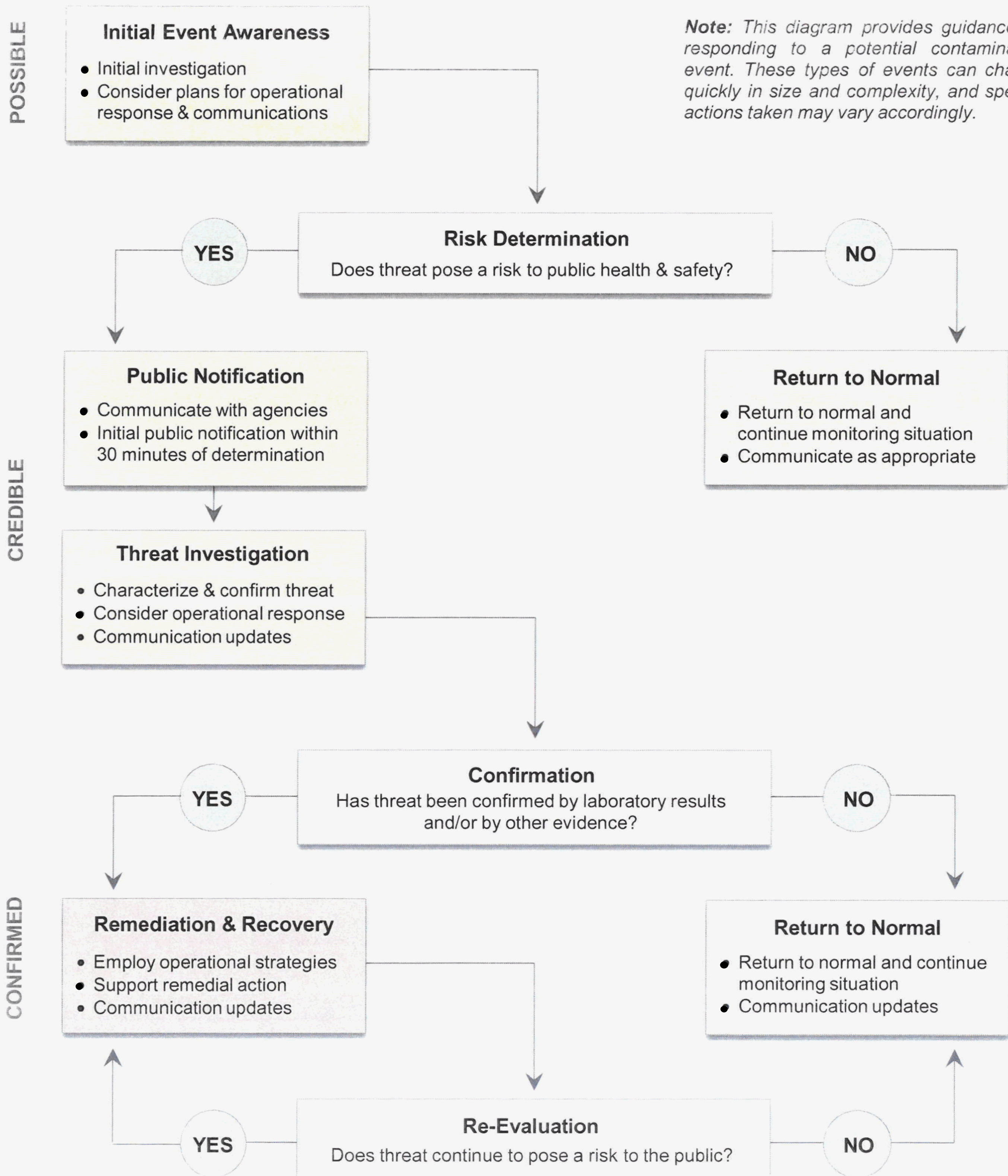
INITIAL NOTIFICATION	
Trigger	Contamination threat notification received
Actions	• Notify Water Quality and Source Water Protection Managers of threat • Water Quality and/or Source Water Protection Manager escalate, if appropriate
Decision	Is threat realistic and does it have the potential to cause harm?
Roles	Initial responder, water quality, source water protection
POSSIBLE PHASE	
Trigger	Threat is realistic and has potential to cause harm
Actions	• Conduct initial investigation to evaluate threat and whether it poses a risk to public • Consider plans for operational response and communications
Decision	Does threat pose a risk to public health and safety?
Roles	Establish ICS structure appropriate for phase (see Attachment A examples)
CREDIBLE PHASE	
Trigger	Threat poses a risk to public health and safety
Actions	• Communicate with appropriate agencies and notify the public within 30 minutes of determination that a threat to public health and safety exists • Continue investigation to characterize and confirm threat • Consider operational response • Determine whether threat can be confirmed through sampling or other evidence • Communicate updates to appropriate agencies and the public
Decision	Has threat been confirmed through sampling or other evidence?
Roles	Establish ICS structure appropriate for phase (see Attachment A examples)
CONFIRMED PHASE	
Trigger	Threat has been confirmed
Actions	• Implement operational actions and support remedial actions to mitigate impacts • Consider resource needs and availability and seek support if appropriate • Determine whether threat continues to pose a risk to the public • Communicate updates to appropriate agencies and the public
Decision	Does threat continue to pose a risk to public health and safety?
Roles	Establish ICS structure appropriate for phase (see Attachment A examples)
EVENT CLOSURE	
Trigger	Threat does not pose a risk to public or system
Actions	• Threat has been reduced or eliminated; return system to normal operations • Continue to monitor situation and modify course if appropriate • Communicate updates to appropriate agencies and the public
Decision	Does threat continue to pose a risk to public health and safety?
Roles	Return to normal operational roles and responsibilities

Contingency Plan Attachment B

EVENT RESPONSE FLOW CHART

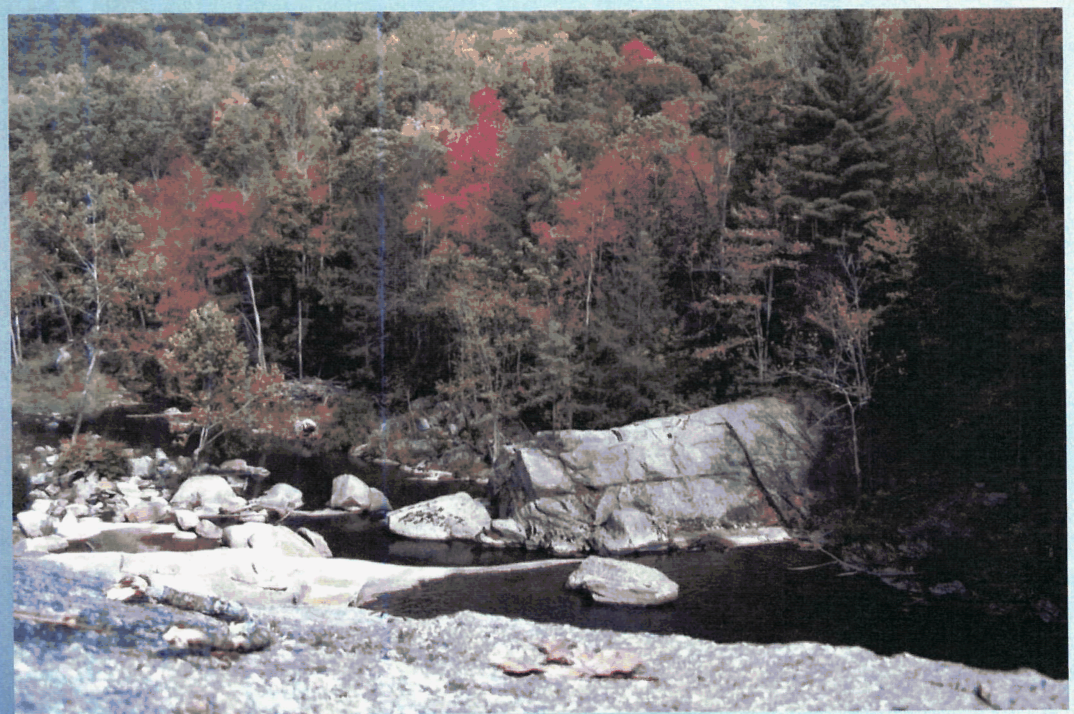
WEST VIRGINIA AMERICAN WATER

Note: *This diagram provides guidance for responding to a potential contamination event. These types of events can change quickly in size and complexity, and specific actions taken may vary accordingly.*



WEST VIRGINIA AMERICAN WATER

Source Water Protection, Preparedness, and Response Tabletop Exercise



October 3, 2018

TTX Schedule

12:00 – 12:30 PM	Check-in
12:30 – 12:45 PM	Participant Introductions
12:45 – 12:55 PM	TTX Introduction
12:55 – 2:00 PM	TTX Discussion
2:00 – 2:15 PM	Break
2:15 – 3:15 PM	TTX Discussion
3:15 – 3:45 PM	Hotwash
3:45 – 4:00 PM	Evaluations/Closing

Administrative Details

- Location of emergency exits
- Location of restrooms
- Cell phone management
- Sign-in sheet and evaluation form

Welcome and Introductions

- ✓ Name
- ✓ Organization

Exercise Objectives

1. Discuss actions taken by WV American Water in the event of a spill into the Elk River.

2. Discuss communication and coordination during a hypothetical incident affecting the water system.

3. Discuss and identify the roles and responsibilities of response partners from local, county, state and federal agencies, as well as private contractors.

Exercise Overview

- Bring together key personnel and partners to discuss a hypothetical scenario
- Opportunity to assess plans, policies and procedures
- Discuss the roles and responsibilities of response partners

Tabletop (TTX) Exercise Structure

- Facilitator-led discussion
- Minimal simulation, no attempts to arrange elaborate facilities or communication
- Informal and stress-free
- Success hinges on your participation and feedback
- Post-TTX Hotwash
- Homeland Security Exercise and Evaluation Program (HSEEP)

Exercise Rules

- There is no single solution
- Varying viewpoints, even disagreements, are expected
- Dialogue is encouraged within a safe, open, stress-free environment
- Respond based on your knowledge
- Make your best decision based on the circumstances presented

Exercise Rules

- Assume cooperation and support from other responders and agencies
- Basis for discussion consists of scenario narrative, your experience, understanding, and intuition
- All information required to drive discussion during the TTX is contained in the exercise material
- Treat the scenario as if it might affect your area
- Don't "fight" the scenario

Roles and Responsibilities

- **Exercise Facilitator** – Provides situation updates via exercise injects, and moderates discussions
- **Players** – Actively respond (i.e., discuss) to the situation presented

Hotwash Session

- After the discussion, participants will identify next steps, actions, tasks, and other follow-up activities to strengthen WV American Water's emergency preparedness

- Identify additional collaborators (if needed)

"WHAT NOW!?!" Scenario

Background

It is early fall and the weather is cool and wet, which is a welcome change after a hot summer.

River levels are average for this time of year throughout the state and along the Elk River.

8:00 A.M. Monday, September 10th

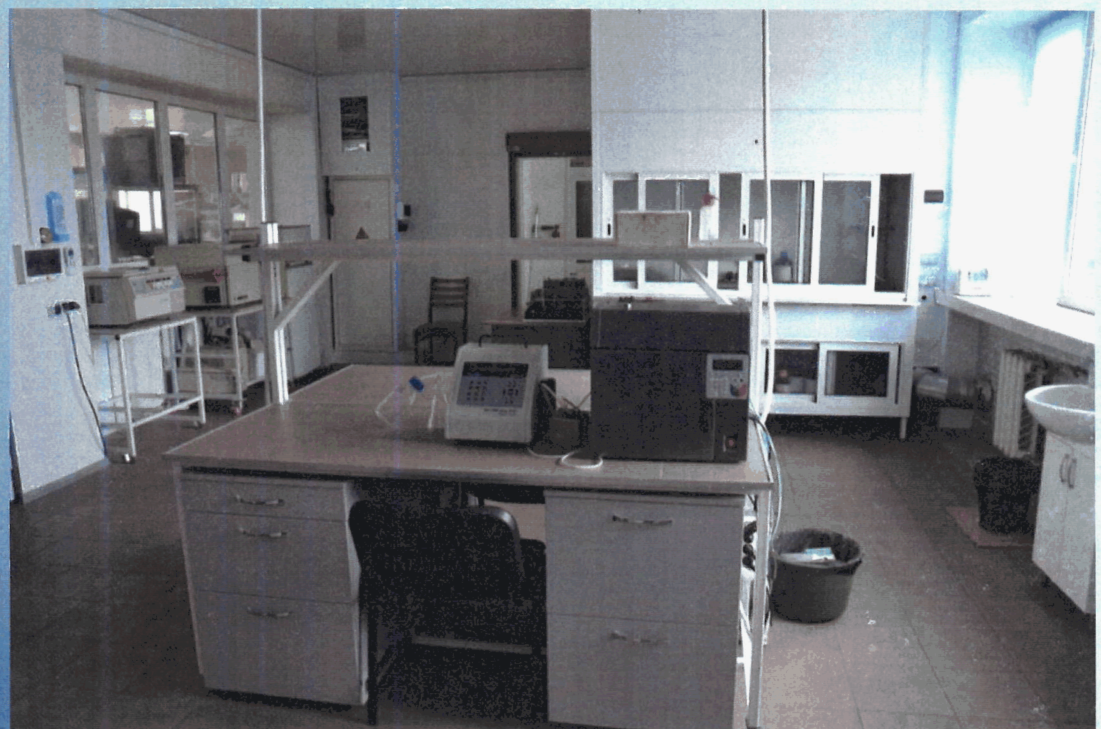
Online water quality monitoring sensors at the intake report elevated pH and TOC levels.

9:00 A.M. Monday, September 10th

The hospital has been getting an influx of patients complaining of severe nausea, stomach cramps, and dizziness. Most say they noticed their water had an unusual odor.

10:00 A.M. Monday, September 10th

GC Mass Spec readings at the treatment plant intake show elevated hydrocarbon concentrations.

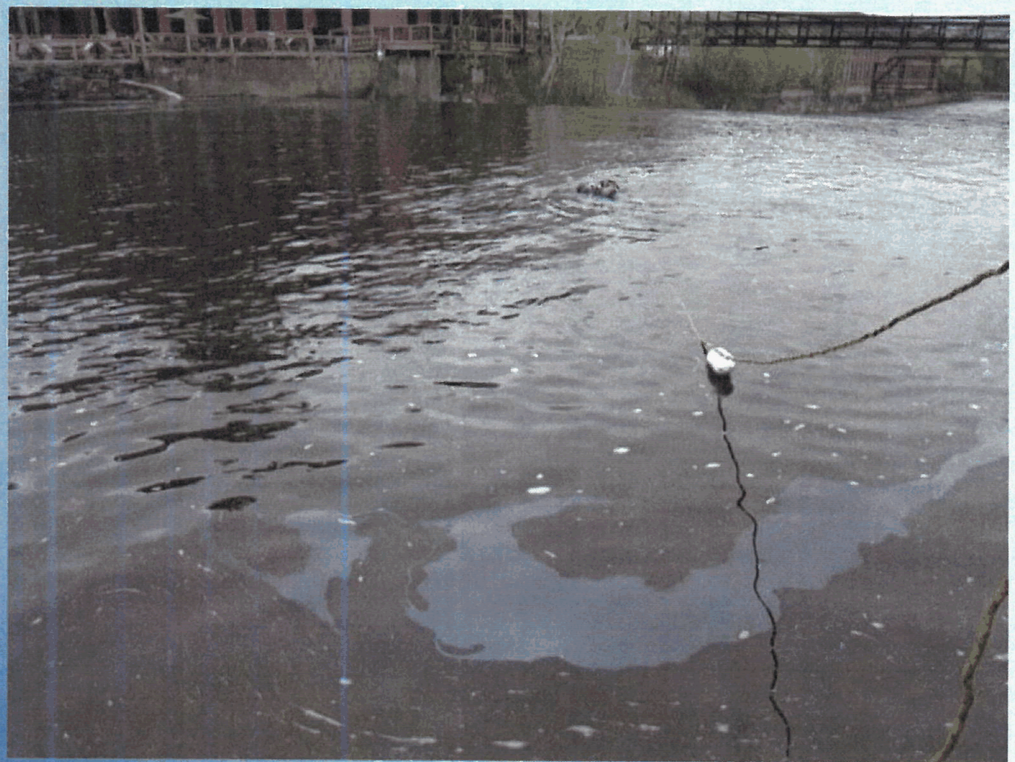


10:30 A.M. Monday, September 10^{th}

A caller to the local radio's popular morning show says that all his neighbors are sick and asks what is going on with the drinking water.

11:00 A.M. Monday, September 10th

A report is made to the local emergency services. A sheen is reported on the Elk River.

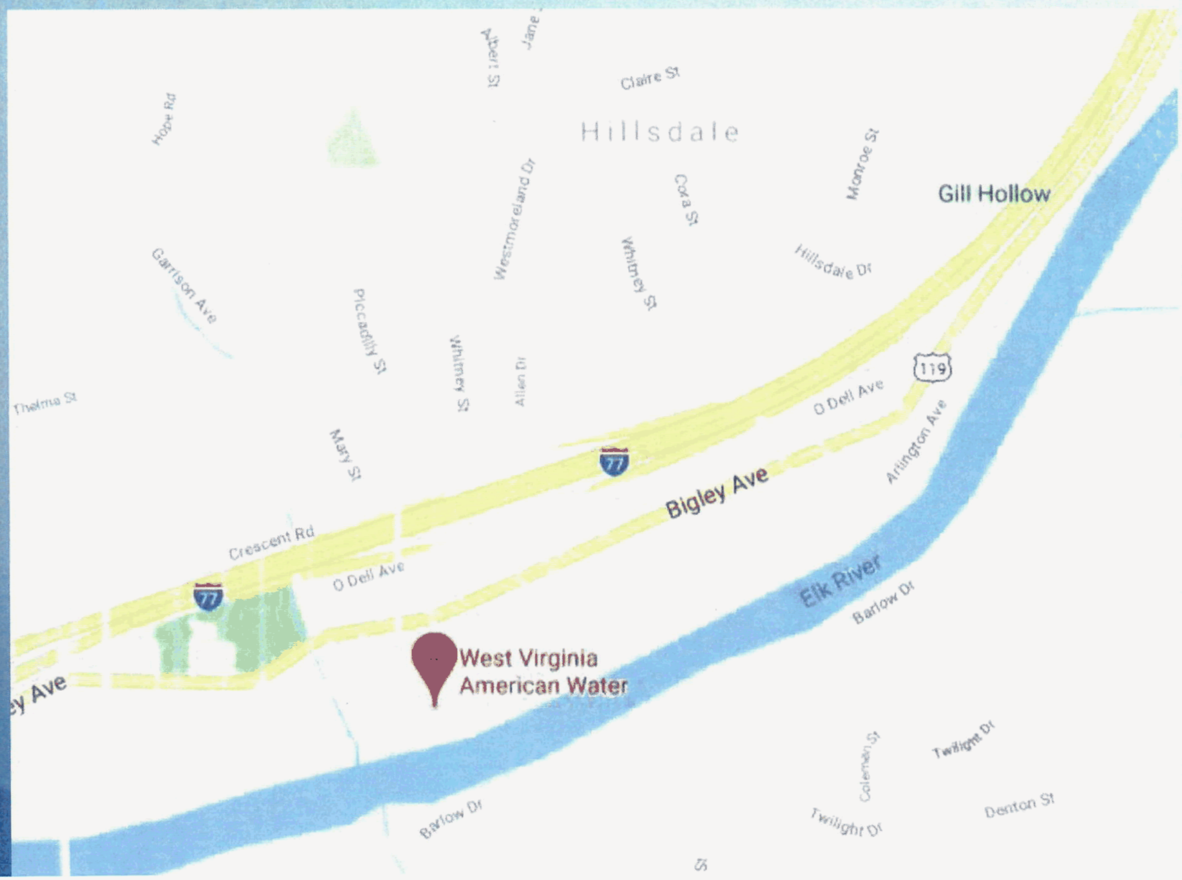


12:30 P.M. Monday, September 10th

The utility receives a notification from DHHR, based on information from the DEP Spill Hotline, that a release has occurred from a fuel tank and fuel may have made its way into the Elk River. The spill report indicates that the location of the release is downstream from WV American Water's intake on the Elk River. No release amounts were reported.

1:30 P.M. Monday, September 10th

Hospital staff notify state Public Health officials that all patients impacted by water exposure are from Hillsdale neighborhood. This neighborhood is near the WVAW treatment plant.

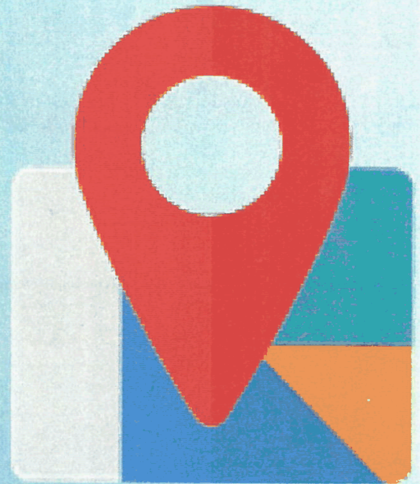


1:45 P.M. Monday, September 10th

Local television stations report the release and connect it to the influx of patients to the hospital.

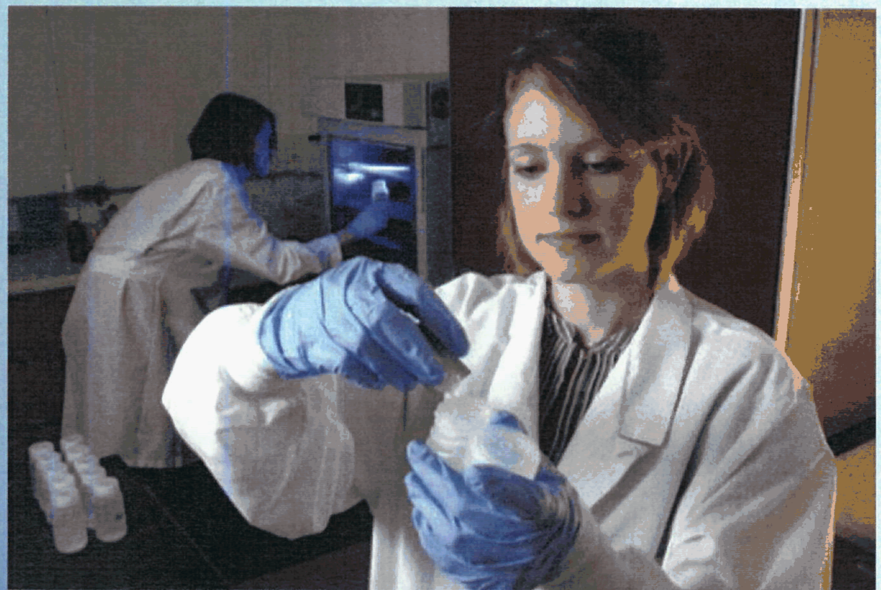
2:00 P.M. Monday, September 10th

Based on information from the DEP Spill Hotline, DHHR issues a second notification for the same release. The spill report corrects the actual location of the spill. The exact location of the release is a fuel tank located 1 mile upstream of the intake on the Elk River.



2:30 P.M. Monday, September 10th

Laboratory analysis of raw and finished water indicates that no hydrocarbons from the release have entered the distribution system.



2:45 P.M. Monday, September 10th

DEP reports that emergency response crews have contained the release from the fuel tank. No further discharge to the Elk River is expected.

3:45 P.M. Monday, September 10th

The hospital notifies the utility that additional patients have complained of getting sick. All of the patients are from the Hillsdale neighborhood.

6:00 P.M. Monday, September 10th

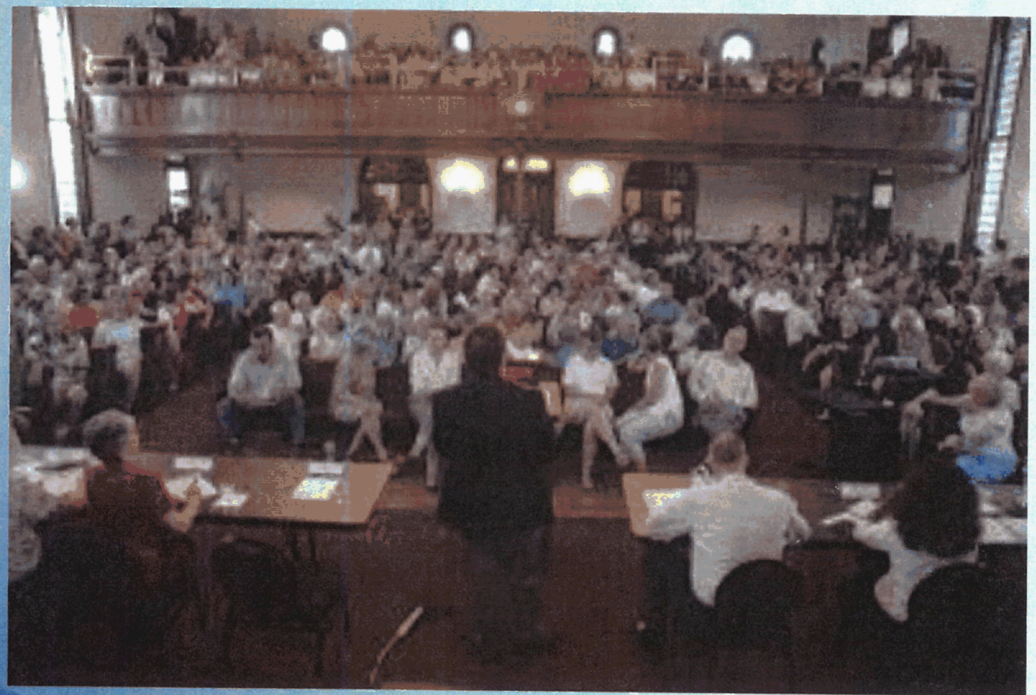
WVAW crews search for possible sites where contamination could enter the distribution system in the Hillsdale neighborhood. They find that a chemical release occurred at a residence when a check valve failed.

7:00 A.M. Tuesday, September 11th

The State EOC and local EOC are coordinating to identify any assistance that state agencies can provide.

Long Term Issue

WV American Water has conducted public outreach to ensure the public that the drinking water supply is safe to consume, but there are renewed public concerns about the safety of the water supply.



Hotwash Session

- Participants will identify next steps, actions, tasks, and other follow-up activities to strengthen utility preparedness
- Identify additional collaborators (if needed)

Conclusion

Please turn in your participant evaluation form!

West Virginia American Water, Kanawha Valley Tabletop Exercise
October 3, 2018 · Charleston, WV
Participant Evaluation Summary

	Average*
1. The tabletop exercise was well structured and organized.	**4.8**
2. The exercise provided an opportunity to enhance the interaction/coordination between West Virginia American Water (WVAW) and partners during an incident affecting the water supply.	**4.8**
3. The exercise provided an opportunity to review steps in WVAW's Contingency Plan and information about effectively responding to an incident affecting the water supply.	**4.7**
4. Overall, the tabletop exercise was a valuable use of my time.	**4.6**

**Scores are an average of the 18 evaluations we received after the workshop and are based on a scale of 1-5 with 5 being strongly agree and 1 being strongly disagree.*

Describe your overall impression (strengths/weaknesses) of the exercise.

- Good working relationship.
- Strength - Interaction.
- Well prepared/good participation.
- Found it interesting that WVAW would continue to state "water is safe" while a public upgrade could be happening through all and social media; its better to be safe than sorry.
- Great communication between organizations.
- Very good. Perhaps the details could be a little more accurate.
- Being able to discuss source water protection with different agencies was enlightening & informative. Weakness: Renovations made it hard to walk through building.
- Good presentation & good structure brought about a lot of open discussion.
- Better understanding of local Gov't expectations from WVAWC interaction builds trust.

What materials did you find most useful?

- Good thought provoking drill.
- Knowing the strengths and especially the limitations of testing times etc.
- Slides.
- Discussion / interaction.
- Info from WVAW. Being very open about the process.
- Understanding that only receiving partial information at a time can be very real in a real life situation.
- No materials; just listening to other opinions from government workers was useful.
- Visual presentation.

Provide recommendations for improving future exercises.

- Excellent exercise.
- Make the exercise more difficult to where responses must happen like 2014.
- Not sure we heard from everyone in attendance (maybe some people are shy LOL).

Exhibit 8

Freshwater Mussel Survey on the Elk River for Site Selection of Proposed Instream Monitoring Stations, Kanawha County, West Virginia, Summer, 2018

FINAL REPORT:

Freshwater Mussel Survey on the Elk River for Site Selection of Proposed Instream Monitoring Stations, Kanawha County, West Virginia, Summer, 2018

Prepared for:

POTESTA

Potesta & Associates, Inc.
7012 MacCorkle Avenue SE
Charleston, WV 25311
P: 304-342-1400
F: 304-343-9031

Project No.: 10463
Date: 4/3/2019

Prepared by:

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Excellence In Any Environment

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www.EnviroScienceInc.com

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ACKNOWLEDGEMENTS

The present study was funded by West Virginia American Water (WVAW) through a contract with Potesta & Associates, Inc. (Potesta). Ms. Lisa Burgess was the project manager for Potesta. Mr. Ryan Schwegman was the project manager for EnviroScience, Inc. Mr. Schwegman served as field supervisor, diver, and as the approved West Virginia Division of Natural Resources mussel surveyor. Mr. Phil Mathias, Ms. Lesley Sneed, Ms. Mary Gilmore, Mr. Chad Reasons, and Mr. Spence George all assisted in the field work. Mr. Ryan Schwegman authored the present report with QA/QC review completed by Ms. Melissa Vaccarino. Mr. Gregory Hocevar provided GIS mapping.

1.0 INTRODUCTION

West Virginia American Water (WVAW) contracted Potesta and Associates, Inc. (Potesta) to provide biological services associated with the selection of sites for the installation of instream monitoring stations within the Elk River between Elk Twomile Creek and the Kanawha Valley Water Treatment Plant's (KVWTP) intake. Initially, three primary locations and three alternative locations were selected on December 20, 2017, and the EnviroScience dive team completed the freshwater mussel habitat survey at all six locations on the Elk River. The purpose of this survey was to identify sites that have the lowest potential to affect natural resources, including freshwater mussels. The results of the habitat survey helped prioritized the sites; those with the lowest quality habitat being the most desirable locations (Table 1). Sites 1, 3 and Alternative 2 were selected as the primary locations for mussel surveys in the summer of 2018 and Sites 3 and Alternative 3A and 3B as the alternative locations. Surveys at alternative locations were to be completed as a mean to avoid mussel resources, the goal is to avoid all mussel resources. The decision to complete additional surveys at alternative locations were to be done in the field by a qualified malacologist.

The Elk River in Kanawha County, WV, has been designated as a Group 4 stream by the United States Fish and Wildlife Service (USFWS) and the West Virginia Division of Natural Resources (WVDNR) because federally listed mussel species are known to occur in that stream reach. Additionally, all freshwater mussel species are protected in West Virginia. Those mussels possibly living in the direct impact area during construction could be crushed, smothered, or dislodged by the placement of the anchors associated with the monitoring stations. Temporary disturbance of the stream bed and riverbanks could result in local scouring and downstream sediment deposition, which are putative sources of unionid impairment and decline (Fuller, 1974; Aldridge, Paine, & Miller, 1987; Bogan, 1993; Williams, Warren, Cummings, Harris, & Neves, 1993).

2.0 METHODS

EnviroScience held all necessary state and federal permits required to collect and handle common and protected mussel species for this project (see Appendix A for WVDNR Site Specific Approval/Permit Addendum, Appendix B for USFWS Concurrence, and Appendix C for Mr. Schwegman's WVDNR Scientific Collector Permit). Methods for the survey were conducted as described below.

2.1 PHASE 1 MUSSEL SURVEY

2.1.1 Extents of the Area of Direct Impact (ADI)

The West Virginia Mussel Survey Protocols by Clayton, Douglas, Morris et. al., 2018 (Protocol) does not contain

stipulations for a project of this kind. However, EnviroScience had determined the use of survey cells no greater than $100m^2$ in size would be appropriate. The survey utilized a 20x1m area of direct impact. Survey buffers of 10m in all directions were applied, creating a survey area 40x21m or $840m^2$. This methodology was provided to and approved by WVDNR and USFWS.

A team of six EnviroScience biologists and divers, directed by an approved WVDNR malacologist, surveyed the project areas for freshwater mussels. The survey was conducted only when visibility at depth was at least 20 inches (0.5m) as required by the Protocol. Divers swept away silt and debris and probed the bottom in promising mussel habitat to detect mussels burrowed into the substrate. Upon completing a search cell, the diver reported river bottom substrate composition using the Wentworth Scale (% observed of silt, sand, gravel, etc.) to allow the team malacologist to assess quality of mussel habitat. Any mussels found were placed in a nylon mesh bag that was tied off with a wire clasp to produce a discrete sample for each search cell.

2.1.2 Species Richness Curve

After the Phase 1 survey was completed, additional 10-min timed searches were conducted within detected mussel concentrations. Data were to be used to construct a species richness curve (mussel numbers vs. cumulate species count) showing that at least six 10-min samples were collected with no new species, as specified in the Protocol. However, due to the absence of data at each of the sites, no species curves were developed.

2.1.3 Data and Mussel Handling

Live mussels found were kept submersed in ambient river water and were kept cool and moist during processing. All live mussels were identified to species, counted, length measured to the nearest 1.0mm, and sexed (sexually dimorphic species only) by the team malacologist. Dead shell specimens were scored as fresh dead (dead <1yr, lustrous nacre), weathered dead (dead one to many years; chalky nacre, fragmented, and worn periostracum), or subfossil (dead many years to many decades; severely worn and fragmented). Detailed digital images of the site and representative mussel species were recorded. No quality dead shells were located, no voucher specimens kept or distributed. Data was recorded to allow distinction between the ADI, upstream buffer, downstream buffer, and lateral buffer. Mussel taxonomy followed the nomenclature presented in Williams et al., 2017.

No live mussels were harmed or taken during this project and all specimens gathered were returned to their point of collection as put forth in the Protocol. All data required by WVDNR was recorded on WVDNR Field Survey Forms.

3.0 RESULTS

The final survey plan for the site was approved by WVDNR on May 11, 2018, and by USFWS on June 25, 2018. EnviroScience made several attempts to complete the survey until conditions finally allowed on August 31 and September 1, 2018. Water visibility within all survey areas was equal to or greater than 61cm (24in). All completed WVDNR field forms are provided in Appendix F.

3.1 PHASE 1 MUSSEL SURVEY

3.1.1 Site 1

A total of five live mussels (Table 2) representing five species were detected in the survey area. Only one of the five mussels was located within the ADI (Appendix D). The spot dives for developing the species richness curve did not return any live mussels after six consecutive 10-minute dives, therefore a species richness curve could not be developed. Substrates consisted primarily of boulder, silt, and woody debris. Cell specific data for substrates are provided in Appendix E and representative photos of mussels and the site in Appendix G.

3.1.2 Alternative Site 2

A total of two live mussels (Table 2) representing two species were detected in the survey area. Both mussels detected were located outside of the ADI in the survey buffers (Appendix D). The spot dives to develop the species richness curve did not return any live mussels after six consecutive 10-minute dives, therefore a species richness curve could not be developed. Substrates consisted primarily of boulder, silt, and woody debris. Cell specific substrate data are provided in Appendix E and representative photos of mussels and the site in Appendix G.

3.1.3 Site 3

No live mussels were detected within the survey area. Substrates were dominated by sand, woody debris, and silt. Cell specific substrate data are provided in Appendix E and representative photos of the site in Appendix G.

3.1.4 Site 2

A total of one live mussel (Table 2) was detected in the survey area. Localized thunderstorms and short periods of extremely heavy rainfall began during the survey effort. Eight of the twelve cells were completed prior to the rain. As a safety precaution all field staff took cover on the bank while river conditions rapidly deteriorated. Following this localized rain event, Elk River conditions did not allow for the survey to be completed. Specifically, cells A1, A2, B1, and C1 were not searched (Figure 2b). Substrate data for cells that were surveyed consisted on bedrock, boulder, wood debris and silt. Representative photos of mussels and the site in are provided in Appendix G.

3.2 ESTIMATED MUSSEL ABUNDANCE

A description of the calculations used to estimate abundance is provided below and presented in Tables 3-5. Estimates for Site 2 were not calculated because the data was incomplete.

- In this example calculation we use the data from Site 1. A total of 5 freshwater mussels were collected during the 2018 mussel survey effort.
- 100% search coverage was presumed to be accomplished at search rate of 1.0m^2/min (10.8ft^2/min). Cells were searched at a rate of 2.0m^2/min (21.5ft^2/min), therefore coverage was presumed to be 50%.
    - Because only 50% of the search cell was presumed to be covered, the number mussels were multiplied by two for a total of 10 assumed mussels within Site 1.
- Diver mussel recovery rate was estimated at 40%. While conservative, this estimate has been used on other projects in West Virginia (EnviroScience, Inc., 2001, 2009, 2012, and 2013; Ecological Specialists, Inc., 2002; Michael Baker Jr., Inc., 2013).
    - To calculate density for all species, the number of assumed live mussels (10) was divided by 40% to accommodate for the remaining mussels missed by divers. Therefore, accounting for the 60% of mussels missed, a total 25 were assumed to be in the survey area.
- The total mussels (25) divided by the total area surveyed (840m^2) during the 2018 salvage effort resulted in a density of 0.03 mussels per square meter for all mussel species.

3.3 ESTIMATED MONETARY VALUE

Methods provided in *Investigation and Monetary Value of Fish and Freshwater Mollusk Kills* (Southwick & Loftus, 2017) were utilized to estimate monetary values of mussels. Abundance estimates by genus were calculated utilizing the methods provided above. Mussel production cost by genus is provided in appendix F of Southwick & Loftus, 2017. All mussels collected during the 2018 survey effort were assumed to be adult individuals (5+ years). Mussels are stocked at approximately 2 months of age and survivorship to 5 years of age is assumed to be 15% when no species-specific information is available. This data is provided for each site in Tables 3-5. Estimates for Site 2 were not calculated because the data was incomplete.

- (Estimated Abundance (Genus)/ 0.15) x Cost Per Mussel = Total Estimated Monetary Value

4.0 CONCLUSIONS

No evidence of federally listed mussel species was detected within any region of the project area. All mussels collected during the Phase 1 survey effort were returned to their point of collection. No triggers for a Phase 2 survey, per the Protocol, were met at any of the sites during the Phase 1 survey efforts.

Relative to the other survey site locations, Site 1 had the highest density with five individuals, and the highest diversity with five different species. As part of WVAW's commitment to minimize impacts to freshwater mussels and other natural resources, they have elected to remove this location from the list of potential sites for water monitoring devices. The Phase 1 survey for Site 2 was incomplete; without a full data set from all cells at the site it is impossible to draw conclusions of the species assemblage at this location. Due to a lack of data, WVAW has elected to also remove Site 2 from the list of potential sites.

Site 3 was dominated by poor habitat and no mussels were located during the Phase 1 survey, making it an obvious choice for the placement of a water monitoring device. At Alternative Site 2, only two individuals of two different species were detected during the Phase 1 survey, one within the upstream survey buffer and one within the downstream survey buffer. No mussels were detected within the proposed direct impact area. Given the extremely low densities of mussels and the relatively poor habitat located within the survey area, EnviroScience recommends further coordination with the WVDNR and USFWS. While a salvage and relocation may be deemed necessary before the project can continue, we have provided an estimated monetary value for freshwater mussels at Alternative Site 2 in the results. Contribution to the WVDNR Wildlife Resource Section further freshwater mussel recovery throughout the state in a more effective manner compared to time and money spent salvaging from a low-density, small impact area as this project presents.

Future construction plans at the project area should incorporate standard best management practices, avoidance, and minimization measures to diminish impacts to nearby resident mussel populations and other aquatic life.

5.0 LITERATURE CITED

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Tables

Table 1. Proposed Mussel Survey Locations in Order of Priority

Name	Coordinates
Site 1	-81.624503, 38.358667
Site 3	-81.610864, 38.364922
Alternative Site 2	-81.620264, 38.359431
Site 2	-81.618283. 38.360181
Alternative Site 3A	-81.611625, 38.363706
Alternative Site 3B	-81.612861, 38.362517

*Blue highlight = Alternative Sites

Table 2. Status, Numbers, and Relative Abundance of Freshwater Mussels from Four Potential Water Quality Monitoring Stations on the Elk River

Species	Common Name	Federal Status [1]	WV Status [1]	Live	Station [2]	Relative frequency (% total)
Cyclonaias pustulosa	Pimpleback			1	Alternative 2	12.50%
Fusconaia flava	Wabash Pigtoe			1	Alternative 2	12.50%
Lampsilis cardium	Plain Pocketbook		S2 (T)	1	Site 2	12.50%
Lampsilis siliquoidea	Fatmucket			1	Site 1	12.50%
Leptodea fragilis	Fragile Papershell		S2 (T)	1	Site 1	12.50%
Obliquaria reflexa	Threehorn Wartyback		S2 (T)	1	Site 1	12.50%
Potamilus alatus	Pink Heelsplitter			1	Site 1	12.50%
Quadrula quadrula	Mapleleaf		S2 (T)	1	Site 1	12.50%
Total:				8		100.00 %
No. of Species:				8		

1 - S2(T) = WV Threatened
2 - No mussels were found at Site 3

Table 3. Site 1 Estimated Mussel Density, Abundance and Monetary Value by Genus

Genus	Estimated Density	Estimated Abundance (840m²)	Mussels Required Using Factor of 0.15	Cost per Mussel	Cost Totals
Lampsilis	0.006	5	34	$27.20	$924.80
Leptodea	0.006	5	34	$22.93	$779.62
Obliquaria	0.006	5	34	$47.50	$1,615.00
Potamilus	0.006	5	34	$47.50	$1,615.00
Quadrula	0.006	5	34	$129.30	$4,396.20
Totals:	0.030	25	168		$9,330.62

Estimated Abundance and Mussel Required Using Factor of 0.15 are Rounded to Nearest Whole Number

Table 4. Alternative Site 2 Estimated Mussel Density, Abundance and Monetary Value by Genus

Genus	Estimated Density	Estimated Abundance (840m²)	Mussels Required Using Factor of 0.15	Cost per Mussel	Cost Totals
Cyclonaias	0.006	5	34	$129.30	$4,396.20
Fusconaia	0.006	5	34	$60.99	$2,073.66
Totals:	0.012	10	67		$6,469.86

Estimated Abundance and Mussel Required Using Factor of 0.15 are Rounded to Nearest Whole Number

Table 5. Site 3 Estimated Mussel Density, Abundance and Monetary Value by Genus

Genus	Estimated Density	Estimated Abundance (840m²)	Mussels Required Using Factor of 0.15	Cost per Mussel	Cost Totals
N/A	0	0	0	$0.00	$0.00
Totals:	0.000	0	0		$0.00

Figures

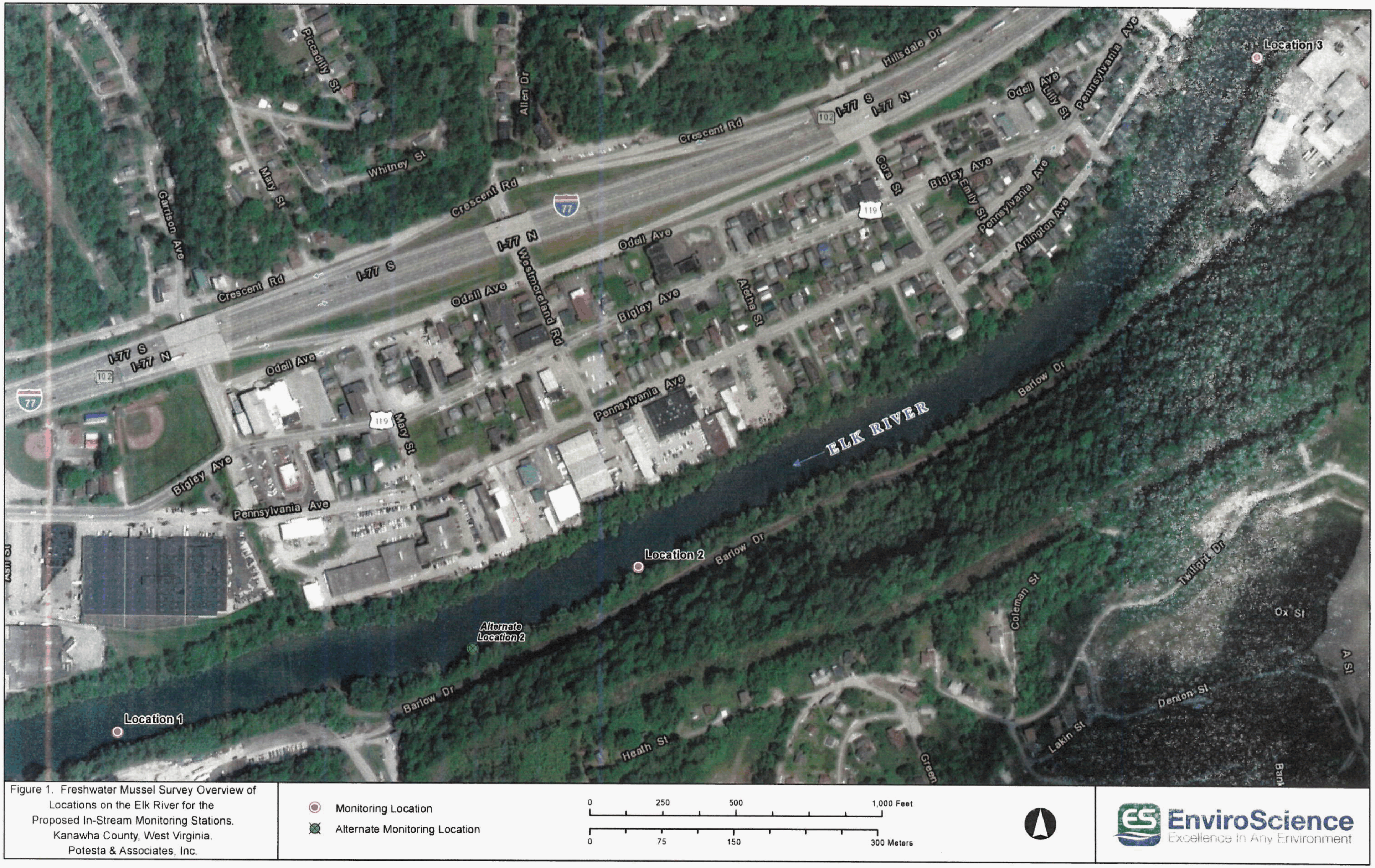


Figure 1. Freshwater Mussel Survey Overview of Locations on the Elk River for the Proposed In-Stream Monitoring Stations. Kanawha County, West Virginia. Potesta & Associates, Inc.

Basemap courtesy of Esri.

Path: P:\10_Projects\P\Potesta_Associates\450M110463_Elk_River_Habitat_Survey\GIS\Map1_MonitoringLocation.mxd

Date: 10/24/2018

Figure 2a. Phase 1 Mussel Survey Locations on the Elk River for the Proposed In-Stream Monitoring Stations. Kanawha County, West Virginia. Potesta & Associates, Inc.

Area of Direct Impact (ADI)
Downstream Buffer
Lateral Buffer
CellBoundaries
Upstream Buffer

0 50 100 200 Feet
0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Date: 10/29/2018
Path: P:\10_Projects\P\Potesta_Associates\480M\10463_Elk_River_Habitat_Survey\GIS\Map2_Site_SurveyLocations.mxd

Basemap courtesy of Esri.

Figure 2b. Phase 1 Mussel Survey Locations on the Elk River for the Proposed In-Stream Monitoring Stations. Kanawha County, West Virginia. Potesta & Associates, Inc.

Date: 10/29/2018 Path: P:\10_Projects\P\Potesta_Associates\480M\10463_Elk_River_Habitat_Survey\GIS\Map2_Site_SurveyLocations.mxd

Basemap courtesy of Esri.

Figure 2c. Phase 1 Mussel Survey Locations on the Elk River for the Proposed In-Stream Monitoring Stations. Kanawha County, West Virginia. Potesta & Associates, Inc.

Area of Direct Impact (ADI)
Downstream Buffer
Lateral Buffer
CellBoundaries
Upstream Buffer

0 50 100 200 Feet
0 15 30 60 Meters

EnviroScience
Excellence In Any Environment

Date: 10/29/2018
Path: P:\10_Projects\P\Potesta_Associates\450M\10463_Elk_River_Habitat_Survey\GIS\Map2_Site_SurveyLocations.mxd

Basemap courtesy of Esri.

Appendix A

WVDNR Permit Addendum

Division of Natural Resources
Wildlife Resources Section
Elkins Operations Center
738 Ward Rd., PO Box 67
Elkins, WV 26241
Telephone 304-637-0245
Fax 304-637-0250

Stephen S. McDaniel
Director

ADDENDUM TO SCIENTIFIC COLLECTING PERMIT NO. 2018.202

Permittee: Ryan Schwegman
Address: EnviroScience, Inc.
5070 Stow Road
Stow, OH 44224

Expiration Date: September 30, 2018

THE FOLLOWING PROVISIONS ARE ADDED TO THIS PERMIT: Mussel surveys are permitted on the Elk River at six sites beginning approximately 1mi upstream from its confluence with the Kanawha River, Charleston, Kanawha County (WV American Water monitoring stations).

THIS ADDENDUM MUST BE ATTACHED TO ORIGINAL PERMIT.

Must be signed before valid.

Signature of permittee

Scientific Collecting Permit Coordinator

Date of issue 5/11/2018

Appendix B

USFWS Concurrence

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
90 Vance Drive
Elkins, West Virginia 26241

Concurrence Form for Freshwater Mussel Survey Plans

Contact Name: Ryan Schwegman

Email Address or Fax Number: rschwegman@enviroscience.com

FWS File # 2017-i-0510 **All future correspondence should clearly reference this FWS File #.**

Project: Elk-River In-stream Monitoring Stations, Kanawha County, WV

The U.S. Fish and Wildlife Service (Service) has reviewed the survey plan you submitted on May 10, 2018 and we concur with the proposed survey methods. You propose surveys on the Elk River within a stream reach that could contain federally endangered freshwater mussels.

Should any federally listed freshwater mussels be located during this survey, you should immediately contact this office to determine if additional survey efforts should be completed and further discuss avoidance and minimization measures that could be implemented. This additional information will assist the Service and your client(s) in any consultations conducted under section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U. S. C. 1531 *et seq.*). Please note that relocation of federally listed mussels is not authorized.

____ May proceed with Phase II surveys
_✓_ May not proceed with Phase II surveys (applicant did not provide adequate justification that alternative construction methods or locations are not feasible)

We request that the following be provided in the final survey reports:

1) Name, permit number, and location (latitude, longitude) of the proposed project;
2) A map with the project boundary and survey boundary indicated;
3) A description of the results of the survey effort, including the species of mussels located, the number of individuals of each species, and the location of any federally listed mussels;
4) The dates that the surveys were conducted, and a description of the habitat conditions found during the survey effort, including visibility, substrate types, water temperatures and depths;
5) Photographs of species located and the survey area;
6) Copies of field data sheets; and
7) Any additional information that may be relevant.

Please be aware that these survey activities require a valid West Virginia Scientific Collectors Permit, which can be acquired from the West Virginia Division of Natural Resources, Elkins Operation Center, Ward Road, Elkins, West Virginia, 26241 (contact Barbara Sargent at 304-637-0245). Please provide a copy of your valid permit with your final report. **All federally listed species captured must be reported to the U.S. Fish and Wildlife Service, West Virginia Field Office, within 5 business days.** If you have questions regarding this finding or report requirements, please contact our office at (304) 636-6586 or at the letterhead address.

Amanda Selinor ______________________ Date: 6/5/2018
Biologist

John E. Schmidt ______________________ Date: 6/11/2018
Field Supervisor

Appendix C

WVDNR Permit

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Elkins Operations Center
738 Ward Rd., PO Box 67
Elkins, WV 26241
Telephone 304-637-0245
Fax 304-637-0250

Stephen S. McDaniel
Director

NUMBER 2018.202

SCIENTIFIC COLLECTING PERMIT

Under Authority Conferred by Chapter 20, Article 2, Section 50, Code of West Virginia, As Amended

Ryan Schwegman
EnviroScience, Inc.
5070 Stow Road
Stow, OH 44224

is hereby permitted to collect specimens according to the attached application and the Special Provisions on the reverse side of this permit.

This permit is not transferable and expires on October 1, 2018.

A complete list of all specimens collected will be kept and reported to the Director of the Division of Natural Resources of West Virginia no later than 45 days after the expiration date of this permit.

PERMIT PROVISIONS

I understand that (1) The privileges granted under this permit are not transferable, and to allow anyone other than myself to use my permit is unlawful and will be considered cause for revocation of said permit; (2) A Federal Scientific Collection Permit issued by the U.S. Department of Interior must be obtained before any migratory birds, or their nests or eggs, are collected or held in captivity; (3) The Federal Permit does not extend the privileges of the permittee beyond those granted by the Division of Natural Resources; (4) Permission must be obtained from either the owner or the custodian of any fenced or posted land before entering same for the purpose of collecting scientific specimens; (5) It is unlawful to carry a revolver or pistol contrary to Article VII, Chapter 61, Code of West Virginia; (6) It is unlawful to collect specimens with a gun on a Sunday; (7) It is unlawful to sell, offer for sale, barter, or offer to barter any wild animals, wild birds, fish or frogs collected; (8) When traps or nets or other devices are used UNATTENDED while exercising the privileges of this permit, said traps, nets, or devices must have attached thereto a tag bearing the name, address and number of the Scientific Collecting Permit; (9) It is unlawful to take or attempt to take any wild animals, wild birds, fish or frogs under said permit except for scientific and propagation purposes; (10) A hunting or fishing license must be obtained before specimens may be taken for sport; (11) Only those species or classes of wild birds, wild animals, fish or frogs listed below, and in the numbers stated, may be lawfully taken under said permit; and (12) I am required by law to carry my Scientific Collecting Permit, on my person while exercising the privileges granted thereunder, and to exhibit the permit to anyone requesting to see the same.

Must be signed before valid.

Signature of permittee

Chief, Wildlife Resources, WVDNR

Date of issue April 5, 2018

Appendix D

Cell Mussel Data

			A (100m^2)		B (10m^2)		C (100m^2)	
Station	**Cell**	**Survey Area**	**Species**	**Search time**	**Species**	**Search time**	**Species**	**Search time**
Site 1	1	USB	POAL=1	50 min	0	2 min	LASI ♀ n=1	50 min
Site 1	2	LB/ADI	0	20 min	0	2 min	LEFR=1	50 min
Site 1	3	LB/ADI	OBRX=1	50 min	QUQU=1	5 min	0	20 min
Site 1	4	DSB	0	20 min	0	2 min	0	20 min
Site 2	1	USB						
Site 2	2	LB/ADI			0	2 min	0	20 min
Site 2	3	LB/ADI	LACA ♀ n=1	50 min	0	2 min	0	20 min
Site 2	4	DSB	0	20 min	0	2 min	0	20 min
Alternative 2	1	USB	0	20 min	0	2 min	CYPU=1	50 min
Alternative 2	2	LB/ADI	0	20 min	0	2 min	0	20 min
Alternative 2	3	LB/ADI	0	20 min	0	2 min	0	20 min
Alternative 2	4	DSB	0	20 min	0	2 min	FUFL=1	50 min
Site 3	1	USB	0	20 min	0	2 min	0	20 min
Site 3	2	LB/ADI	0	20 min	0	2 min	0	20 min
Site 3	3	LB/ADI	0	20 min	0	2 min	0	20 min
Site 3	4	DSB	0	20 min	0	2 min	0	20 min

*gold shading indicates ADI

Appendix E

Cell Substrate Data

Appendix E. Substarte by Cell

Station	Cell	Survey Area	A (100m^2)	B (10m^2)	C (100m^2)
Site 1	1	USB	40% Silt, 30% Boulder, 30% WD	40% Silt, 30% Boulder, 30% WD	40% Silt, 40% Mud, 10% Gravel, 10% WD
Site 1	2	LB/ADI	40% Silt, 30% Boulder, 30% WD	40% Silt, 30% Boulder, 30% WD	40% Silt, 40% Mud, 10% Gravel, 10% WD
Site 1	3	LB/ADI	40% Silt, 30% Boulder, 30% WD	40% Silt, 30% Boulder, 30% WD	40% Silt, 40% Mud, 10% Gravel, 10% WD
Site 1	4	DSB	40% Silt, 30% Boulder, 30% WD	40% Silt, 30% Boulder, 30% WD	40% Silt, 40% Mud, 10% Gravel, 10% WD
Site 2	1	USB			
Site 2	2	LB/ADI		40% Silt, 40% BR, 10% Gravel, 10% WD	40% Silt, 40% BR, 10% Gravel, 10% WD
Site 2	3	LB/ADI	30% Silt, 40% BR, 20% Gravel, 10% WD	40% Silt, 40% BR, 10% Gravel, 10% WD	40% Silt, 40% BR, 10% Gravel, 10% WD
Site 2	4	DSB	30% Silt, 40% BR, 20% Gravel, 10% WD	40% Silt, 40% BR, 10% Gravel, 10% WD	40% Silt, 40% BR, 10% Gravel, 10% WD
Alternative 2	1	USB	40% Silt, 30% Boulder, 30% WD	40% Silt, 30% Boulder, 30% WD	30% Silt, 30% Boulder, 10% Gravel, 30% WD
Alternative 2	2	LB/ADI	40% Silt, 30% Boulder, 30% WD	40% Silt, 30% Boulder, 30% WD	30% Silt, 30% Boulder, 10% Gravel, 30% WD
Alternative 2	3	LB/ADI	40% Silt, 30% Boulder, 30% WD	40% Silt, 30% Boulder, 30% WD	30% Silt, 30% Boulder, 10% Gravel, 30% WD
Alternative 2	4	DSB	40% Silt, 30% Boulder, 30% WD	40% Silt, 30% Boulder, 30% WD	30% Silt, 30% Boulder, 10% Gravel, 30% WD
Site 3	1	USB	40% Silt, 30% Sand, 30% WD	40% Silt, 30% Sand, 30% WD	20% Silt, 50% Sand, 30% WD
Site 3	2	LB/ADI	40% Silt, 30% Sand, 30% WD	40% Silt, 30% Sand, 30% WD	20% Silt, 50% Sand, 30% WD
Site 3	3	LB/ADI	40% Silt, 30% Sand, 30% WD	40% Silt, 30% Sand, 30% WD	20% Silt, 50% Sand, 30% WD
Site 3	4	DSB	40% Silt, 30% Sand, 30% WD	40% Silt, 30% Sand, 30% WD	20% Silt, 50% Sand, 30% WD

Appendix F(a)

Protocol Form

Mussel Survey Scope of Work Summary Sheet 2018

Form Date: 1/8/2018

Project Title: Water Quality Monitoring Stations on the Elk River

Project Company:	West Virginia American Water	Date Submitted:	11/15/2018
Mussel Contractor:	EnviroScience, Inc.	Date Revised:	
Lead Malacologist:	R. Schwegman		
Project Contractor:	Potesta Associates	(if Mussel Contractor sub-contracting)	
Divers: if applicable	All ES approved divers	lead diver that can provide QA/QC survey effort	

County: Kanawha County — Group (Circle One): 1 2 3 4

Stream: Elk River — Location Description: 1 nautical mile upstream from the confluence with the Kanawha to 1.85 nautical miles upstream from the confluence

If Group 1 or 2, Receiving Stream: Kanawha River

NOTE: Watershed Area < 10sq mi US of ADI, no survey needed, unless Group 2 (1/2)

Project Type: ______ (corresponds to Table 3, WV Mussel Survey Protocol)

ADI Length:	20m	ADI Width:	1m	Salvage area (m2):	
US Buffer Length:	10m	US Buffer Width:	21m	US Buffer Length:	
DS Buffer Length:	10m	DS Buffer Width:	21m	DS Buffer Length:	
Lateral Buffer Length:	20m	Lateral Buffer Width:	10m	Lateral Buffer Width:	

Phase 1 Survey Method: Transect ☐ Cells ☒ Other ☐

# Transects/Length (m):		Cell Size (mxm):	Cell Search Effort (Min/m^2)
	ADI:	10x1	0.2/m^2
	USB:	10x10; 10x1	0.2/m^2
	DSB:	10x10; 10x1	0.2/m^2

Minimum search effort for cells is 0.2min/m^2 if no mussels are found or 0.5min/m^2 if any mussels are found

______ Spacing Between Transects (M)

Sites

Site 1

Coordinates (Decimal Degrees, NAD83)

	Long.	Lat.
Upstream End US Buffer:	-81.610761	38.365083
Upstream End ADI:	-81.610813	38.365001
ADI Center:	-81.624503	38.358667
Downstream End ADI:	-81.610911	38.364838
Downstream End DS Buffer:	-81.610960	38.364760

Alternative 2

Coordinates (Decimal Degrees, NAD83)

	Long.	Lat.
Upstream End US Buffer:	-81.620055	38.359505
Upstream End ADI:	-81.620157	38.359471
ADI Center:	-81.620264	38.359431
Downstream End ADI:	-81.620366	38.359393
Downstream End DS Buffer:	-81.620471	38.359358

Site 3

Coordinates (Decimal Degrees, NAD83)

	Long.	Lat.
Upstream End US Buffer:	-81.610732	38.365070
Upstream End ADI:	-81.610799	38.364995
ADI Center:	-81.610864	38.364922
Downstream End ADI:	-81.610932	38.364852
Downstream End DS Buffer:	-81.611004	38.364779

Site 2

Coordinates (Decimal Degrees, NAD83)

Upstream End US Buffer:	Long.	-81.618096	Lat.	38.360293
Upstream End ADI:	Long.	-81.618186	Lat.	38.360236
ADI Center:	Long.	-81.618283	Lat.	38.360181
Downstream End ADI:	Long.	-81.618374	Lat.	38.360129
Downstream End DS Buffer:	Long.	-81.618468	Lat.	38.360076

Did you provide? Justification must be provided in scope of work

Addressed Alternative Methods [x] Yes Provide Description in Scope

Addressed Alternative Sites [x] Yes Provide Description in Scope

Phase 2 Methods (Group 2):

\# Quadrats excavated N/A Be sure to define area on Map/Diagram

Salvage area only

Request for Relocation: [ ] Yes [x] No

Method:

(check one)

[ ] Cell Size (mxm): ________ Cell Search Effort (Min/m^2) ________ (minimum)

[ ] Moving Transect:

[ ] Other:________________

Multiple passes are to be made through the area until less than 5 % of the number collected on the original pass are recovered on the final pass or less

Appendix F(b)

WV Field Forms: Current Stream and Weather Conditions

4/29/2016

Current Stream and Weather Conditions

Section A
1. Collector Name: Schwegman, Ryan
3. Stream/Site Name: Elk River/ Charleston, WV
4. LLID (dnr use):
5. Date (MM/DD/YYYY):8/31/2018 and 09/01/2018
6. Project: Elk River Instream Monitoring Devices
9. Permitee ID: 2018.202

Section B			
Weather Conditions	**Current Conditions**	**Past 24 Hours**	**Past Week**
	Precipitation ☐ Moderate or heavy rain shower ☐ Light rain shower ☐ Light rain ☐ Moderate rain ☐ Heavy rain X None **Sky Conditions** 0 25 50 75 100% cloud cover __26____Air temp (°C)	**Precipitation** ☐ Moderate or heavy rain shower ☐ Light rain shower ☐ Light rain ☐ Moderate rain ☐ Heavy rain X None **Sky Conditions** 0 25 50 75 100% cloud cover __26____Air temp (°C)	Has there been a heavy rain in the last 7 days? Yes/No

Section C			
Stream Characterization	**Human Influence**		
	X Engineered Dam	☐ Pipes(inlet/outlet)	☐ Trash
	☐ Pipeline crossing	☐ Channelized	☐ Island__________
	☐ Ford	☐ Bridge (pillars in stream)	☐ Other__________
	☐ Pipeline (parallel to stream)	☐ Bridge (no pillars in stream)	☐ Wall/Dike/Revet-ment/Riprap
	In Stream Cover		
	☐ Debris Dam	☐ Blow Down	☐ Beaver Dam
	☐ Woody debris	☐ Other __________	

Section D				
Aquatic Vegetation	**Indicate the dominant types and record the dominant species present.**			
	☐ Rooted emergent	☐ Rooted floating	☐ Floating algae	X None
	☐ Rooted submergent	☐ Free floating	☐ Attached algae	☐ Moss
	Dominant species____________________			
	Percent of the reach with aquatic vegetation _______% (in terms of area)			

Section E										
Watershed Features	**Human Influence/Watershed Features** (within survey reach)					P=>10m from shore, C=within 10m, B=on the bank, **D=dominant land use (check no more than two)**				
		P	C	B	D		P	C	B	D
	Wall/Rip rap	x				Railroad (Active)				
	Railroad (rails to trails)					Railroad (Inactive)				
	Buildings					Landfill/trash				
	Pavement					Park/Lawn				
	Road					Row Crops				
	Pasture					Feed lots				
	Logging operations					Mining activity				

4/29/2016

Watershed Features (Cont.)		P	C	B	D		P	C	B	D
	Forest					Commercial/Industrial				x
	Old field					Hay field				
	Residential					Other____________				
	Local Watershed Erosion (pertains to land use, not failing stream banks) ☐ None ☐ Moderate ☐ Heavy									

Section F

Water Quality

Temperature (°C) ___25___
Conductivity uS/cm ___N/A__
Dissolved Oxygen mg/L__N/A___
pH __N/A____
Turbidity (mg/L) ___N/A___
Secchi depth (m.mm) __N/A____
Meters used:_________________
____
Hach Kit used Yes/No
Water Sample Collected for Lab analysis Yes/No
Flow at nearest USGS gauging station (cfs)______________
Gauging station:____________________________

Water Odors
☐ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other____________

Turbidity (visual) (___61__CM)
☐ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Stained ☐ Other _____

Water Surface Oils
☐ Slick ☐ Sheen ☐ None
☐ Globs ☐ Flecks ☐ Other____________

Section G Site 1

Sediment/ Substrate

Odors
☐ Normal ☐ None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Anaerobic (methane)
☐ Other____________

Deposits
☐ Sludge ☐ Leaf Litter ☐ Sand
☐ Relict Shells ☐ Other ___________
☐ Paper/fiber ☐ Other ___________

Substrate Type (rank top three, 1 being dominant)
__Bedrock _1_Boulder __Cobble __Gravel __Sand _2_Silt/clay

Section G Site 2

Sediment/ Substrate

Odors
☐ Normal ☐ None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Anaerobic (methane)
☐ Other____________

Deposits
☐ Sludge ☐ Leaf Litter ☐ Sand
☐ Relict Shells ☐ Other ___________
☐ Paper/fiber ☐ Other ___________

Substrate Type (rank top three, 1 being dominant)
_1_Bedrock _2_Boulder __Cobble __Gravel __Sand _3_Silt/clay

Section G Alternative Site 2

Sediment/ Substrate

Odors
☐ Normal ☐ None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Anaerobic (methane)
☐ Other____________

Deposits
☐ Sludge ☐ Leaf Litter ☐ Sand
☐ Relict Shells ☐ Other ___________
☐ Paper/fiber ☐ Other ___________

Substrate Type (rank top three, 1 being dominant)
__Bedrock _1_Boulder __Cobble __Gravel _3_Sand _2_Silt/clay

4/29/2016

Section G	**Site 3**					
Sediment/ Substrate	**Odors**			**Deposits**		
	☐ Normal	☐ None	☐ Sewage	☐ Sludge	☐ Leaf Litter	☐ Sand
	☐ Petroleum	☐ Chemical		☐ Relict Shells	☐ Other ____________	
	☐ Anaerobic (methane)			☐ Paper/fiber	☐ Other ____________	
	☐ Other____________					
	Substrate Type (rank top three, 1 being dominant)					
	__Bedrock	__Boulder	__Cobble	__Gravel	_1_Sand	_2_Silt/clay

Section H				
Streambank and Riparian Zone Characterization	**Canopy Cover**		**Stream Bank Failure Present?** (within survey reach only)	
	X Mostly Open	☐ Shaded	Right Descending Bank Yes/No	Left Descending Bank Yes/No
	☐ Mostly Shaded	☐ None		
	Riparian Zone (10 meters) fully intact			
	Right Descending Bank Yes/No	Left Descending Bank Yes/No		

Notes: Heavy rain was experienced during survey effort, due to lighting all survey activities stopped and were never resumed.

Appendix F(c)

Mussel Survey Summary Data Sheet

Mussel Survey Summary Data Sheet

Section A

1. Collector Name: Schwegman, Ryan — **2. Permit ID:** 2018.202

1b. Surveyor(s) (Last Name, First, MI) — **1c. Company:** ES

Marquette, Cortney; Mathias, Phil; Sneed. Lesely; Reasons, Chad; Gilmore, Mary; George, Spencer

3. Stream Name: Elk River

4. Site Name: Site 1

5. Date: MM/DD/YYY 8/31/2018

6. Project: Instream Monitoring Devices

Section B: Survey Method

! Waterscope
x SCUBA /SSA
! Snorkel
! Other_____

Section C: Survey Time & Area

Total Effort (min) 291
Total Area (m^2) 840

Section D: Surveys Conducted

! Transects
x Cells
! Quantitative with excavation
! Qualitative

Section E Species	Area USB	DSB	ADI	LB		Total Number Live	Fresh Dead	Weathered Dead
OBRX				1		1		
POAL	1					1		
LASI	1					1		
LEFR				1		1		
QUQU			1			1		
Search Effort (min)	**102**	42	7	140				
Search Area (m^2)	210	210	20	400				

NOTES

1/8/2018

Mussel Survey Summary Data Sheet

Section A

1. Collector Name: Schwegman, Ryan **2. Permit ID:** 2018.202

1b. Surveyor(s) (Last Name, First, MI) **1c. Company:** ES

Marquette, Cortney; Mathias, Phil; Sneed. Lesely; Reasons, Chad; Gilmore, Mary; George, Spencer

3. Stream Name: Elk River

4. Site Name: Site 2

5. Date: MM/DD/YYY 9/1/2018

6. Project: Instream Monitoring Devices

Section B: Survey Method

- ! Waterscope
- x SCUBA /SSA
- ! Snorkel
- ! Other____________

Section C: Survey Time & Area

Total Effort (min) 136

Total Area (m^2) 840

Section D: Surveys Conducted

- ! Transects
- x Cells
- ! Quantitative with excavation
- ! Qualitative

Section E Species	Area USB	DSB	ADI	LB		Total Number Live	Fresh Dead	Weathered Dead
LACA				1		1		
Search Effort (min)	0	42	4	90				
Search Area (m^2)	210	210	20	400				

NOTES Incomplete survey due to rain, never searched upstream extent

1/8/2018

Mussel Survey Summary Data Sheet

Section A

1. Collector Name: Schwegman, Ryan **2. Permit ID:** 2018.202

1b. Surveyor(s) (Last Name, First, MI) **1c. Company:** ES

Marquette, Cortney; Mathias, Phil; Sneed. Lesely; Reasons, Chad; Gilmore, Mary; George, Spencer

3. Stream Name: Elk River

4. Site Name: Site Alternative 2

5. Date: MM/DD/YYY 9/1/2018

6. Project: Instream Monitoring Devices

Section B: Survey Method		Section C: Survey Time & Area		Section D: Surveys Conducted	
!	Waterscope			!	Transects
x	SCUBA /SSA	Total Effort (min)	228	x	Cells
!	Snorkel	Total Area (m^2)	840	!	Quantitative with excavation
!	Other_____________			!	Qualitative

Section E Species	Area USB	DSB	ADI	LB		Total Number Live	Fresh Dead	Weathered Dead
FUFL		1				1		
CYPU	1					1		
Search Effort (min)	**72**	72	4	80				
Search Area (m^2)	210	210	20	400				

NOTES

1/8/2018

Mussel Survey Summary Data Sheet

Section A

1. **Collector Name:** Schwegman, Ryan — 2. **Permit ID:** 2018.202

1b. **Surveyor(s) (Last Name, First, MI)** — 1c. **Company:** ES

Marquette, Cortney; Mathias, Phil; Sneed. Lesely; Reasons, Chad; Gilmore, Mary; George, Spencer

3. **Stream Name:** Elk River
4. **Site Name:** Site 3
5. **Date: MM/DD/YYY** 9/1/2018
6. **Project:** Instream Monitoring Devices

Section B: Survey Method		Section C: Survey Time & Area		Section D: Surveys Conducted	
!	Waterscope			!	Transects
x	SCUBA /SSA	Total Effort (min)	168	x	Cells
!	Snorkel	Total Area (m^2)	840	!	Quantitative with excavation
!	Other__________			!	Qualitative

Section E Species	Area USB	DSB	ADI	LB		Total Number Live	Fresh Dead	Weathered Dead
Search Effort (min)	**42**	42	4	80				
Search Area (m^2)	210	210	20	400				

NOTES

1/8/2018

Appendix G

Digital Images

Digital Images from the Freshwater Mussel Survey on the Elk River for Site Selection of Proposed Instream Monitoring Stations in Kanawha County, West Virginia, Summer 2018

Digital image 1. Site 1 view upstream along the left descending bank.

Digital Image 2. Alternative Site 2 looking at the right descending bank.

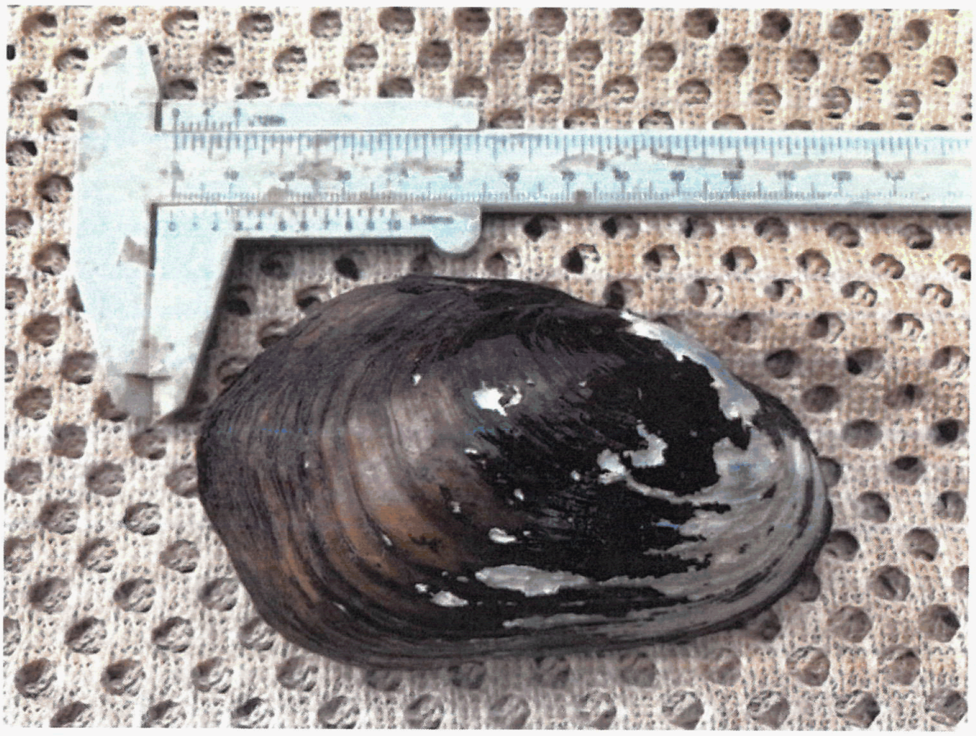
Digital Images from the Freshwater Mussel Survey on the Elk River for Site Selection of Proposed Instream Monitoring Stations in Kanawha County, West Virginia, Summer 2018

Digital Image 3. Site 3 looking at the left descending bank.

Digital Image 4. Site 2 after major localized rain event.

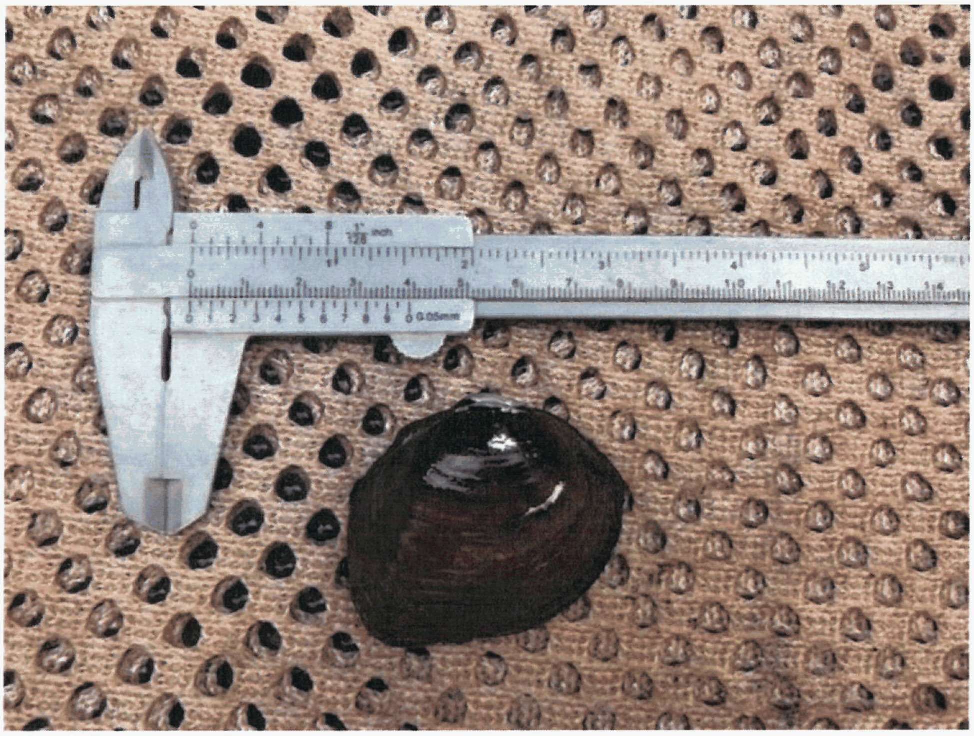
Digital Images from the Freshwater Mussel Survey on the Elk River for Site Selection of Proposed Instream Monitoring Stations in Kanawha County, West Virginia, Summer 2018

Digital Image 5. Pimpleback (*Cyclonaias pustulosa*).

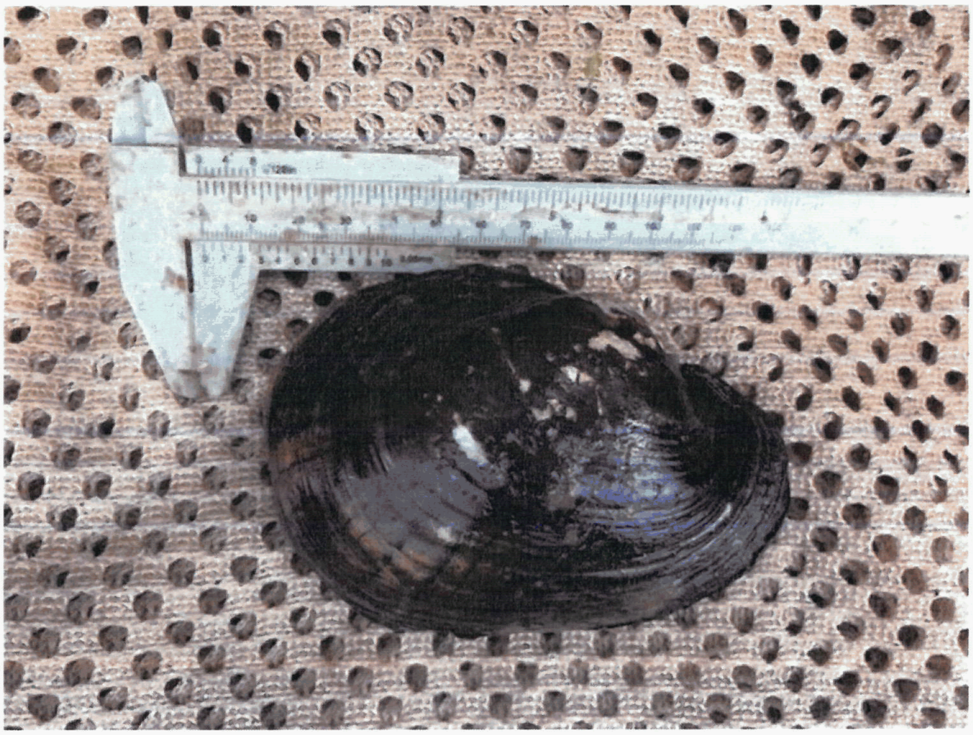


Digital Image 6. Fatmucket female (*Lampsilis siliquoidea*).

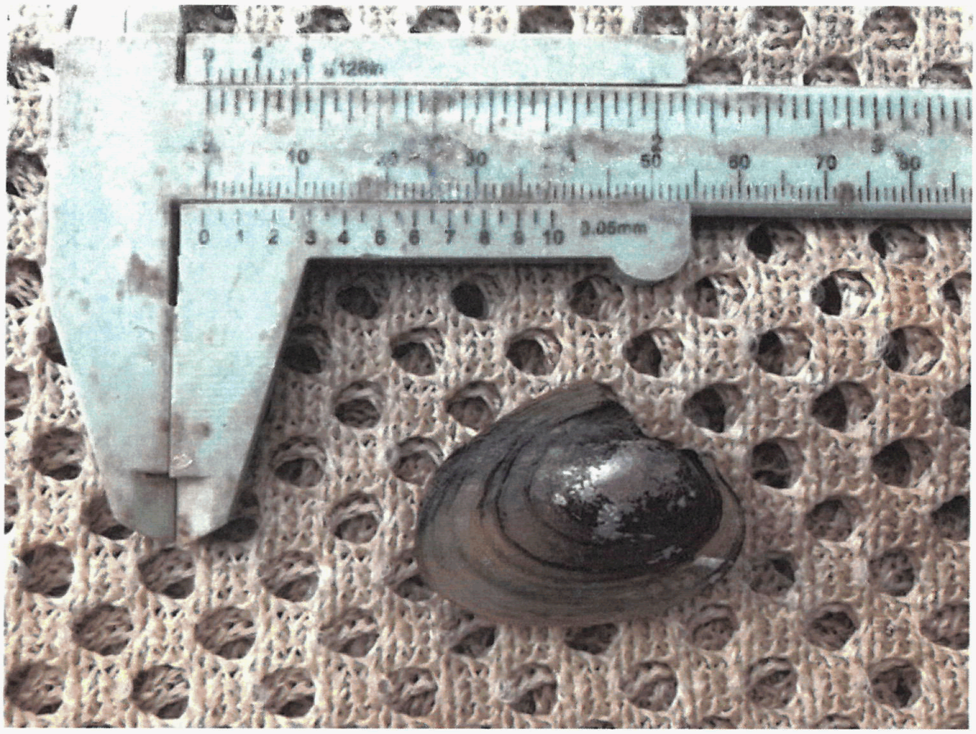
Digital Images from the Freshwater Mussel Survey on the Elk River for Site Selection of Proposed Instream Monitoring Stations in Kanawha County, West Virginia, Summer 2018



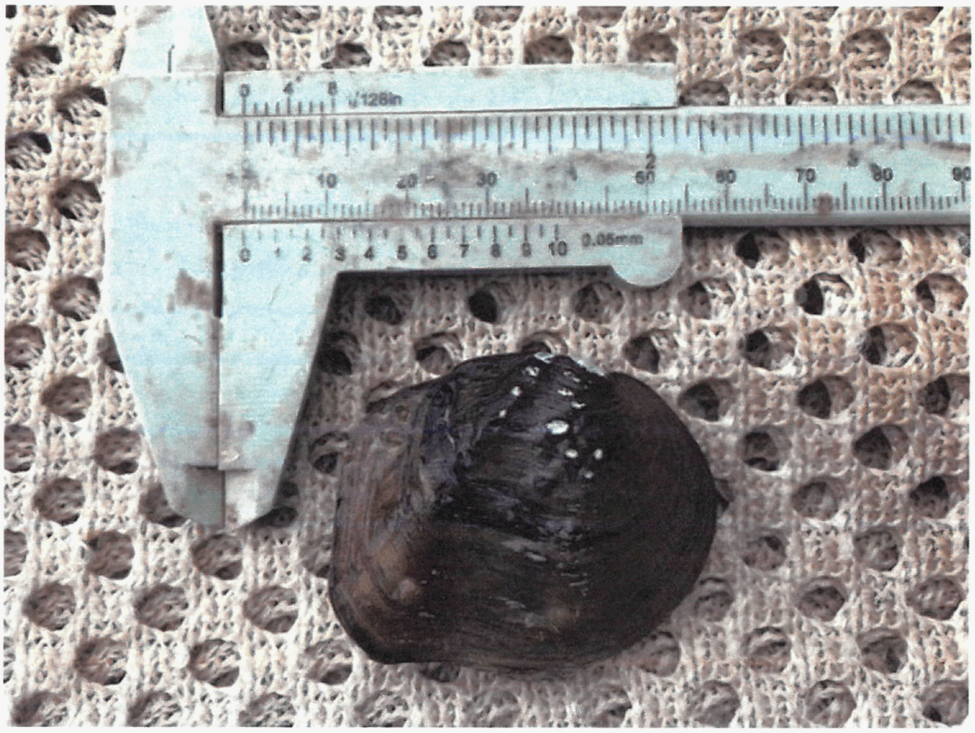
Digital Image 7. Wabash Pigtoe (*Fusconaia flava*).



Digital Image 8. Plain Pocketbook (*Lampsilis cardium*).

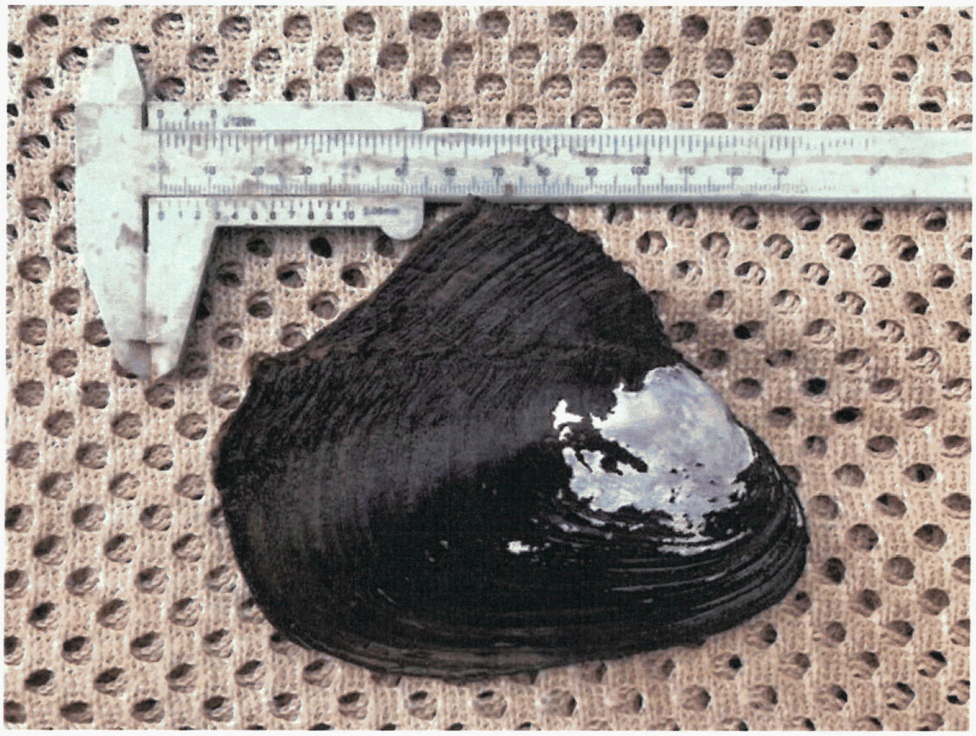


Digital Image 9. Fragile Papershell (*Leptodea fragilis*).

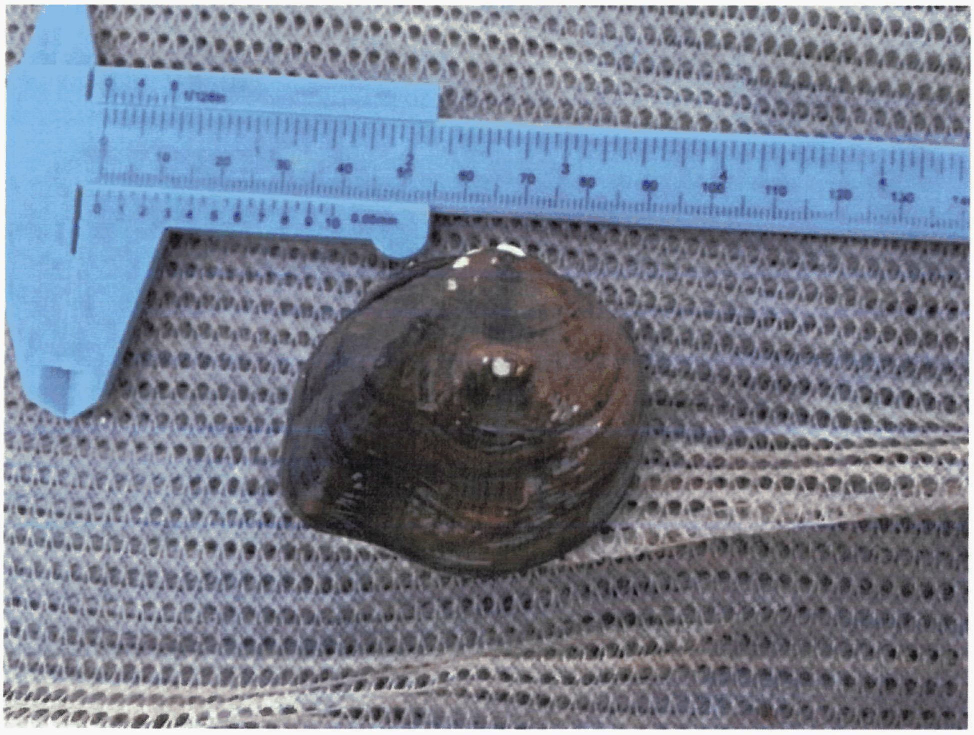


Digital Image 10. Mapleleaf (*Quadrula quadrula*).

Digital Images from the Freshwater Mussel Survey on the Elk River for Site Selection of Proposed Instream Monitoring Stations in Kanawha County, West Virginia, Summer 2018



Digital Image 11. Pink Heelsplitter (*Potamilus alatus*).



Digital Image 12. Threehorn Wartyback (*Obliquaria reflexa*), photo from a nearby Kanawha River Survey.

Exhibit 9

Water Quality Sonde Installation on the Elk River, Kanawha County, WV, April 2019

DIVISION OF NATURAL RESOURCES
Wildlife Resources Section
Elkins Operations Center
738 Ward Rd., PO Box 67
Elkins, WV 26241
Telephone 304-637-0245
Fax 304-637-0250

Stephen S. McDaniel
Director

April 29, 2019

Erica Pauken,
Source Water Protection State Lead
West Virginia American Water
1600 Pennsylvania Avenue
Charleston, WV 25302

Subject: Water Quality Sonde installation on the Elk River, Kanawha County, WV

Dear Ms Pauken:

I have reviewed the supplemental information that you provided concerning the above project. As the two sites selected did not have mussels located within the area of direct impacts, the State will not require further mussel issues to be addressed. However, since this is a Group 2 stream in which federally listed fish and mussels are expected, the US Fish and Wildlife Service must provide concurrence before placement of the water quality sondes and associated anchors.

Should you have any questions, please feel free to contact me at the above address or phone number.

Sincerely,

Janet L. Clayton
Mussel Program Leader

cc: Danny Bennett, Barbara Sargent, Amanda Selnick, Lisa Burgess

Exhibit 10

Concurrence Form for Freshwater Mussel Survey Report, May 2019

United States Department of the Interior

FISH AND WILDLIFE SERVICE

West Virginia Field Office
90 Vance Drive
Elkins, West Virginia 26241

Concurrence Form for Freshwater Mussel Survey Report

Contact Name: Lisa Burgess

Email Address or Fax Number: LKBurgess@potesta.com

FWS File # 2017-i-0510 **All future correspondence should clearly reference this FWS File #.**

Project: West Virginia American Water, Elk River In-stream Monitors, Site 3 and Alternative Site 2, Kanawha County, WV

This responds to your letter dated April 15, 2019 regarding the results of a mussel survey on the Elk River in conjunction with the above referenced project. These comments are provided pursuant to the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.)*

A mussel survey within the project area was conducted from 08/31/2018 to 09/01/2018. A total of 2 individuals of 2 species were located. Although the Elk River is known to provide habitat for the federally endangered clubshell, snuffbox, pink mucket, northern riffleshell and rayed bean mussels, no freshwater mussels of these species were observed during the survey effort. Therefore, no federally listed mussels are expected to be adversely affected by this project.

This letter provides technical assistance only and does not serve as a completed section 7 consultation document. If there is a federal nexus for the project (e.g., federal funding provided, federal permits required to construct), no project construction activities on any portion of the parcel should occur until consultation under section 7 of the ESA, between the U.S. Fish and Wildlife Service (Service) and the federal action agency, is completed. Section 7 consultation is not complete until the federal action agency submits a determination of effects to this office, and the Service concurs with the federal action agency's determination. If there is no federal nexus associated with this project, then no further coordination with this office is required.

Should project plans change, or if additional information on listed and proposed species becomes available, or new species are listed or critical habitat designated, this determination may be reconsidered. These survey results are considered valid for five years from the date of completion. If the project is not completed before that time, additional survey efforts may be required. Please note that if any federally listed species are found during any future survey or relocation efforts for native freshwater mussels, this determination will no longer be considered

valid. You should immediately contact the Service and reinitiate consultation before proceeding with any further project efforts.

If you have any questions regarding this letter, please contact the biologist listed below at (304) 636-6586, or at the letterhead address.

Amanda Murnane Date: 5/29/2019

Biologist

John E. Schmidt Date: 5/31/2019

Field Supervisor

cc:
WVDNR-Clayton

Exhibit 11

Protecting The Source: Your Water, Our Plan, Kanawha Valley Stakeholder Engagement Electronic Invitation, April 2019

Kanawha Valley Stakeholder Engagement Electronic Invitation, April 2019

WEST VIRGINIA
AMERICAN WATER

WE KEEP LIFE FLOWING™

IN PERSON MEETINGS

Kanawha Valley System
(Central Operations)

Join us in person for a presentation on source water protection and an opportunity to provide input on WVAW source water protection plans and/or potential sources of contamination to your local water supply.

WHEN

Tuesday, May 21, 2019
11:30 AM to 1:00 PM*

Tuesday, May 21, 2019
6:00 PM to 7:30 PM*

WHERE

*Both meetings will be held at the Clay Center Walker Theater, 1 Clay Square, Charleston, WV 25301

PROTECTING THE SOURCE: YOUR WATER, OUR PLAN

Protecting drinking water at its source is an important part of the process to treat and deliver high quality water.

West Virginia American Water has developed Source Water Protection Plans to identify and reduce potential risks to drinking water supplies. We are in the process of updating these plans and want YOUR input. The public comment period for the 2019 Source Water Protection Plan updates will be from April 20th 2019 to May 30th 2019. Comments may be submitted in person, via webinar, online, or in writing.

CAN'T ATTEND IN PERSON? NO WORRIES.

WEBINARS

We understand not everyone may be able to attend meetings in person. This year, we have added the option of attending a webinar to learn about the plans and provide input. Each webinar will cover information for all West Virginia American Water systems. Participants will have the opportunity to access the updated Plans prior to and following the webinar and ask questions specific to their water system. (Instructions included at the bottom of the email)

Webinar Information and Instructions: Please join us to learn about the Source Water Protection Plans and provide your input. At the event time, please use the link below to join the webinar. Once you join the event, call-in information will be provided to you. If you can only join by phone, please use the call-in information provided below. Please note that the call-in information is unique for each webinar event. To register, visit https://amwater.com/wvaw/water-quality/source-water-protection/provide-input-in-person.

- **April 23, 12:00 – 1:00 pm**
  Call-in toll number (US/Canada):
  1-650-479-3208
  Access code: 669 519 571
- **April 23, 6:00 – 7:00 pm**
  Call-in toll number (US/Canada)
  1-650-479-3208
  Access code: 664 524 504
- **April 24, 12:00 – 1:00 pm**
  Call-in toll number (US/Canada)
  1-650-479-3208
  Access code: 660 231 722
- **April 24, 6:00 – 7:00 pm**
  Call-in toll number (US/Canada)
  1-650-479-3208
  Access code: 667 631 546

CLICK HERE TO REGISTER for the online Webinars.

ONLINE/IN WRITING

Comments may be submitted online anytime at www.westvirginiaamwater.com under the following menu: Water Quality > Source Water Protection >Source Water Protection Feedback Form. All submissions will be directed to your local Source Water Protection Lead. Submit written comments addressed to:

West Virginia American Water
Attention: Source Water Protection State Lead
1600 Pennsylvania Avenue, Charleston, WV 25302

Exhibit 12

Distribution Storage Tanks for
Kanawha Valley System, June 2019

Distribution Storage Tanks for the Kanawha Valley System, June 2019

TANK NAME	FULL VOLUME x 1000 GALLONS
AIRPORT	300
ALLEN	102
ALLEN'S ROUTE	107
AMANDAVILLE NO.1	4000
AMANDAVILLE NO.2	4000
ANGEL FORK	100
ARCHIBALD HILL NO.1	100
ARCHIBALD HILL NO.2	193
ASBURY HEIGHTS	151
BALD KNOB (JAMES CREEK)	115
BARRETT	250
BEACON RIDGE	50
BELLE	500
BERRY HILLS	506
BLOUNT	198
BRYAN HILL	117
BRYNWOOD	150
CARBON	164
CEMETERY #2	508
CHAPPELL HOLLOW	150
CHELYAN	173
CHESTNUT STREET	508
CHILDRESS MOUNTAIN	453
CLEARVIEW	41
CLENDENIN #1	100
CLENDENIN #2	750
CLENDENIN CITY HILL	65
COURTNEY	122
CRESTWOOD	35
CROOKED RIDGE	100
CROSS LANES	514
CULLODEN	500
DOCTORS CREEK	160
DONNALLY HOLLOW	5
DRAWDY #1	500
DRAWDY #2	1,000
DUTCH RIDGE	115
EAGLE VIEW NO.1	135
EAGLE VIEW NO.2	157
EDENS FORK	170

TANK NAME	FULL VOLUME x 1000 GALLONS
EDGEWOOD FOREST	148
EDGEWOOD HILLS	101
EDGEWOOD SUMMIT	194
EDGEWOOD TERRACE	152
EDGEWOOD,UPPER	67
ELKVIEW	10
ESKDALE(CHELYAN PSD)	198
FERRY BRANCH	522
FOREST PARK	502
FRP BUFFER	6
GEORGE WASHINGTON	500
GRANDVIEW (elevated)	220
GREENVIEW	150
GUTHRIE STANDPIPE (BRENDA LANE)	202
HAMLIN	330
HUGHESTON	1,000
JIM BEE RIDGE (WALKER RIDGE)	130
JOE'S CREEK	122
JORDAN HILL	158
KELLY CREEK	160
LEATHERWOOD	158
LENS CREEK #2	500
LENS CREEK MTN #1	500
LILLY DRIVE	152
LOWGAP	300
MADISON	250
MARMET	135
MASSEY	230
MILLIKEN	1,011
MONTGOMERY	300
MOUNT ALPHA	212
MOUNT OLIVE #1	1,027
MOUNT OLIVE #2	1,000
NITRO	1,008
PARK WEST	202
PINCH	750
PINCH RIDGE	100
PLINY	750

TANK NAME	FULL VOLUME x 1000 GALLONS
POCATALICO	250
POND GAP	100
PRATT NO. 1	150
PRATT NO. 2	150
PRICE BRANCH	187
QUARRY CREEK (LANE GRAFF)	507
QUEEN SHOALS	150
RIDGEWOOD	206
SETH	122
SHARPLES	100
SHREWSBURY	211
SOUTH CHAS. RES.	1,000
SOUTH OAKRIDGE	227
SOUTH PARK #1	149
SOUTH PARK #2	101
STADIUM VIEW	2,991
THOROFARE RD. (BIG SANDY)	90
TORNADO	99
TUPPERS CREEK	271
UPPER FRAME	150
UPPER KANAWHA RIVER (PAINT CREEK)	120
VAN	150
VANDALIA #1	2,990
VANDALIA #2	3,284
VORPE ROAD	25
WASHINGTON HEIGHTS	202
WEST	4,800
WEST FORK #1	105
WEST FORK#2	74
WESTMORELAND	101
WILLIAMS MTN	30
WILLS CREEK	258
WOODRUM LANE #1	5
WOODRUM LANE #2	10
YOUNGS BOTTOM	263

TOTAL (X1000 GALLONS)	**50,449**